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Tears for girls and teeth for boys: The influence of gender on children's depiction of sadness  
and anger in their drawings?

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**Abstract**

Up to now, very few studies investigated the influence of gender on the depiction of emotions in children's drawings. However, the literature on emotions reveals differences between boys and girls in various kinds of tasks (e.g., recognizing emotional facial expressions, understanding an emotional situation, etc.). Therefore, we examined the impact of gender on the depiction of sadness and anger. We took into account children's gender but also the gender of the character expressing the target emotion. Forty-four boys and forty-seven girls aged 7 to 8 and thirty-six boys and fifty-three girls aged 9 to 10 were asked to listen to stories where the main character (either a male or a female) was feeling sad or angry and then to draw the facial cues corresponding to the target emotion. Two methods were used to rate the drawings: judges assessed the correct versus incorrect depiction of the two target emotions and a content analysis was then conducted on the correct drawings so as to reveal the type of facial cues used by children. By showing the major influence of children's gender on their depiction of sadness and anger, our findings offer promising lines of research in educational and clinical settings.

Keywords: drawing – emotions – gender – children

Drawing is one of the most pleasant and familiar activities during childhood and allows children to communicate and express emotional information (e.g., Burkitt, 2008, 2017; Jolley, 2010; Monnier, Syssau, Blanc & Brechet, 2016). The ability to produce expressive drawings has already been examined in numerous studies (e.g., Brechet, Baldy & Picard, 2009; Brechet, Picard & Baldy, 2007; Burkitt & Barrett, 2011; Burkitt, Barrett & Davis, 2003a; Burkitt & Sheppard, 2014; Burkitt & Watling, 2016; Cox, 2005; Golomb, 1992; Jolley, Fenn & Jones, 2004; Sayil, 2001). This ability requires both graphic skills and emotional knowledge (Brechet & Jolley, 2014).

Emotional knowledge refers to several abilities. Among them, the recognition of facial expressions has been largely investigated (e.g., Chronaki, Hadwin, Garner, Maurage & Sonuga-Barke, 2015; Gao & Maurer, 2010; Herba & Phillips, 2004; Widen & Russell, 2003). The recognition of facial expressions is an important ability in social interactions because it allows children to adapt their own behavior in response to the emotion felt by others. The ability to recognize facial expressions improves with age and depends on the target emotion (see Herba & Phillips, 2004 for a review). Indeed, from the age of 3-4, children are able to recognize facial expressions of happiness, sadness and anger. Regarding fear, surprise and disgust, children's sensitivity to facial expressions continues to improve between 5 and 10 years of age.

Another important ability within the development of emotional knowledge is children's understanding of emotional situations, like that ones usually encountered in fictional stories. To understand emotional situations, children have to learn the way emotions are expressed but also the causes and the consequences of these emotions (Saarni, Campos, Camras, & Witherington, 2006). From the age of 3-4, children are able to understand and to produce prototypical causes and consequences related to basic emotions (Russell, 1990; Widen & Russell, 2004, 2010). During childhood, children's knowledge of causes and

consequences of emotions increases, leading them to understand more subtle situations and to infer complex emotions as pride or embarrassment (Blanc, 2014; Deconti & Dickerson, 1994; Thompson, 1987; Vendeville, Brechet & Blanc, 2015).

Finally, the development of emotional knowledge also involves children's understanding of display rules about how and when to control emotional displays in accordance with social standards (Birnbaum, Nosanchuk & Croll, 1990; Brechet, 2013; Malatesta & Haviland, 1982; Missailidi, 2006; Parmley & Cunningham, 2008; Saarni, 1979). Regarding gender, these display rules rely on culturally shared stereotypes (Williams & Best, 1990) leading to the idea that some emotions are gendered and that their expression can be more appropriate for boys (e.g., anger) or girls (e.g., sadness). Children acquire knowledge about gender-emotion stereotypes and display rules between three to five years of age and they use these rules in a rigid manner until the age of 6-7 (Ruble, Martin & Berenbaum, 2006; Trautner et al., 2005). After the age of 7, children's knowledge about stereotypes continues to improve but they acquire gender constancy. In other words, they understand that an emotion is not strictly associated to only one gender. So their rigid compliance to these stereotypes begins to decrease and they are able to produce inferences about the opposite gender, taking into account the gender but also the situation.

The development of emotional knowledge through at least the three abilities mentioned above (e.g., recognition of facial expressions, understanding of emotional situations, understanding of gender-emotion stereotypes and display rules) allows children to create their own mental representation of emotions. This representation is crucial when children are asked to depict emotions in their drawings, since it helps them consider which emotional cues are relevant to express specific emotions. However, so as to depict these cues in their drawings, children also have to master graphic skills that increase steadily throughout childhood (Brechet & Jolley, 2014).

Considering the development of children's ability to depict emotions in their drawings, there is a clear consensus regarding the different strategies children use to produce expressive drawings (Picard & Boulhais, 2011; Picard, Brechet & Baldy, 2007). Some of these strategies mainly rely on facial cues (i.e., literal strategies), whereas others consist in either using figurative cues like sun or cloud (i.e., content strategies) or using non-figurative cues like color or size (i.e., abstract strategies). The use of these strategies varies through childhood with literal strategies already used by children aged 7 while content and abstract strategies are used later, around the age of 9. Also, very little progression across childhood is usually observed for literal strategies when acquired, whereas the use of content and abstract strategies continuously increases with age.

Many studies explored children's ability to depict emotions with a focus on one of these strategies: the literal one that corresponds to the use of facial cues (e.g., Cox, 2005; Golomb, 1992; Missaghi-Lakshman & Whissell, 1991; Sayil, 2001, Vendeville, Blanc & Brechet, 2015; Vendeville, Brechet & Blanc, 2015). These studies report an effect of the emotion children have to depict. Happiness is the emotion children are able to depict first, followed by sadness but also anger and then surprise, fear and disgust. This developmental difference between emotions is in line with the literature reported above about the development of emotional knowledge and can also be partly explained by the complexity of the facial cues that are required to express some emotions. Namely, to depict happiness in drawings, children have to use only one facial cue: The upturned mouth. This cue is depicted very early because it is part of the graphic routine. Children as young as 4 years of age know what a happy face looks like and already have the graphic skills required to curve lines in order to depict this emotion in their drawings using an upturned mouth. They are also able to depict straight lines, down-curved lines or enclosed shape to depict other facial cues as the eyes (Brechet et al., 2007; Cox, 2005; Jolley et al., 2004). It is more complex for other

emotions since children have to use more than one facial cue and some cues that are more difficult to depict. For instance, to differentiate anger from sadness, children have to depict eyebrows. Children depict outward eyebrows or no eyebrow to express sadness whereas they depict inward eyebrows to express anger (Brechet et al., 2007; Golomb, 1992). The ability to depict eyebrows and to vary the shape of this facial feature requires more developed graphic skills. For instance, children are able to depict anger around the age of 6, when they can draw mirror oblique lines (Sayil, 2001).

Although there is a general agreement that children's expressive ability improves with age, the age at which children are able to depict emotions with expressiveness differs across studies. Actually, these differences rely on the wide range of methods used to explore children's ability to depict emotions in their drawings. Firstly, different tasks are used: Children can be asked to copy facial cues from an expressive model (e.g., Sayil, 2001), or to complete a character's face with facial cues in order to express an emotion (e.g., Cox, 2005; Vendeville, Blanc & Brechet, 2015; Vendeville, Brechet & Blanc, 2015), or to freely draw a character feeling an emotion (e.g., Brechet et al., 2007, 2009). Secondly, the drawing context also varies across studies: Children are instructed to depict an emotion either from the emotional label provided by the experimenter (e.g., Cox, 2005) or from short stories (created by researchers) describing specific events that are supposed to elicit emotions to the main character (e.g., Brechet, 2013). Recently, longer fictional stories extracted from children's literature have also been used to assess children's ability to depict emotions (e.g., Vendeville, Blanc & Brechet, 2015; Vendeville, Brechet & Blanc, 2015), providing a strong evocative emotional context (Blanc, 2010, 2014; Lynch et al., 2008).

Despite a large disparity in methods and contexts, this corpus of studies is highly informative and leads us to point out how to extend the current state of knowledge. Precisely, this body of research enables us to underline that gender differences need to be further

investigated in the context of children's depiction of emotion using facial cues. In the context of spontaneous drawings, it has been shown that boys tend to represent vehicles or buildings, while girls are more likely to draw flowers and animals. In the same way, boys are more liable to represent aggressiveness and violence in their drawings whereas girls tend to represent peace (Feinburg, 1977; Flannery & Watson, 1995; Silver, 1993). When children are asked to depict emotions in their drawings, differences between boys and girls occur with respect to the strategies they use. Indeed, Picard and Boulhais (2011; see also Picard & Gauthier, 2012) showed that girls use more elaborative strategies than boys. Precisely, girls tend to use literal strategies in combination with content and abstract strategies whereas boys are liable to use literal strategies only. Note that some studies also reported differences between boys and girls in their use of abstract strategies: differences were found according to children's gender regarding the size of the drawings and the use of colors (Burkitt, Barrett & Davis, 2003b; Karniol, 2011). These gender differences should be further explored in the context of facial depiction of emotional cues. To our knowledge, the very few studies that took into account the impact of children's gender on the facial depiction of emotional cues only searched for a difference between correct versus incorrect depiction of emotions and reported no effect of children's gender (e.g., Brechet et al., 2009; Vendeville, Brechet & Blanc, 2015). A more qualitative approach could be of help to investigate whether the type of facial cues used to depict emotions could be sensitive to children's gender. Indeed, by exploring not only the correct versus incorrect depiction of emotions but also the type of facial cues children use to depict emotions in their drawings (i.e., qualitative approach), the present study attempted to reveal differences between boys and girls in the way they perceive the expression of gendered emotions such as sadness and anger, in line with gender-emotion stereotypes and display rules.

Another promising factor neglected in this corpus of studies is the character's gender, despite children's well-known tendency to associate happiness, sadness and fear to female characters and anger to male characters (Birnbaum, Nosanchuk & Croll, 1980; Brechet, 2013; Parmley & Cunningham, 2008). Knowing this influence of gender-emotion stereotypes on children's perception of a character's emotional state, it seems relevant to explore the impact of characters' gender in the context of children's facial depiction of emotion. To our knowledge, no study has yet investigated the influence of gender-emotion stereotypes on the type of facial cues children use when they have to depict gendered emotions (i.e., emotions which are stereotypically associated to males or females) and no study either explored the effect of the character's gender on this facial depiction.

Overall, the aim of the present study is to examine whether both children's and character's gender have an impact on the facial depiction of sadness and anger (two gendered emotions). More precisely, do boys and girls use the same facial cues to depict sadness and anger? Do children use the same facial cues when the character in the story is a male or a female? To respond to these questions, we asked children aged between 7 and 10 to listen to fictional stories and to complete the character's face depicting sadness or anger. Regarding children's age, this developmental period appeared appropriate since children are more flexible about gender stereotypes from the age of 7 (Kohlberg, 1966; Kohlberg & Ullian, 1974; Ruble, Martin & Berenbaum, 2006; Trautner et al., 2005) and both their emotional knowledge and graphic skills are enough developed to enable them to depict and to manipulate the facial cues required to represent sadness and anger (Blanc, 2014; Deconti & Dickerson, 1994; Sayil, 2001). In accordance with display rules and gender-emotion stereotypes, we hypothesized gender differences in children's depiction of sadness and anger. More precisely, since anger is considered a masculine emotion, boys were expected to use more facial cues and/or different types of cues than girls in their angry drawings (e.g., cues,



related to aggressiveness). This may be especially the case with male characters. On the other hand, since sadness is considered a feminine emotion, girls were expected to use more facial cues and/or different types of cues than boys in their sad drawings, especially with female characters.

## **Method**

### **Participants**

One hundred and eighty children participated in this study: Ninety one children aged 7 to 8 named younger children ( $X = 8$  years 1 month;  $SD = 7$  months; 44 boys and 47 girls; range = 7 years 1 month to 9 years 1 month) and eighty nine children aged 9 to 10 named older children ( $X = 10$  years 1 month;  $SD = 7$  months; 36 boys and 53 girls; range = 9 years 1 month to 11 years 1 month). Children were recruited from two French public elementary schools and came from eight different classes (i.e., second, third, fourth and fifth grades, two classes per grade). Participants were in their normal school year and came from families with middle socioeconomics status. Based on teachers' reports, no child presented cognitive disorders or psychomotor disabilities which could interfere with the expressive drawing task.

### **Material**

**Stories.** The stories used in this study are extracts from a series of fictional stories entitled "The Little Nicholas" (Sempé & Goscinny, 1994, 2008, 2010), relating the adventures of a little boy aged 8 named Nicholas and his friends. First, we selected sixteen stories, in which an emotional passage clearly evoked either sadness or anger, without explicitly mentioning it (i.e., 8 stories evoked sadness and 8 stories evoked anger). More precisely, each passage evoked only one emotion by describing an elaborate emotional situation. For example, « *Mom left, and then I heard the car's bell of the ice-cream seller, so I started crying. Dad shouted that if I continued this comedy he was going to give me spanking, and he entered the house by slamming the door behind him* ». In this emotional passage, Nicholas is

sad because he wants an ice-cream but his father refused. In each story, the trigger event of the emotion was strong enough to ensure that the emotion suggested was not ambiguous (Vendeville, Brechet & Blanc, 2015). We chose these two negative emotions (i.e., sadness and anger) because they are gender-stereotyped: sadness is more commonly attributed to females whereas anger is more commonly attributed to males (Brody & Hall, 1993; Brody, Muderrisoglu & Nakash-Eisikovits, 2002; Malatesta & Haviland, 1982; Rose & Rudolph, 2006). In order to make sure that each story evoked the target emotion, we conducted a pre-test with twenty adults ( $M = 27$  years;  $SD = 4$  years). These adults were asked to read the sixteen stories and then to identify the emotion felt by the character given the situation just described in the story, by choosing among the six basic emotions (i.e., happiness, sadness, anger, surprise, fear and disgust) and the answer “I don’t know”. They were also asked to determine the intensity of the emotion felt by the character (on a Likert scale from 1 - very low - to 4 - very high -). On the basis of this pre-test, we selected the eight stories for which most of the adults correctly identified the target emotion and for which most of the adults judged that the emotional intensity was high (i.e., 4 stories for sadness with a mean percentage of correct answer of 88% and a mean intensity of 3.2; and 4 stories for anger with a mean percentage of correct answer of 90% and a mean intensity of 3.0). Note that these stories were similar in terms of length (i.e., number of words and sentences) and duration.

To examine the influence of the character’s gender on the depiction of sadness and anger, we created a female version for each story. Indeed, the main characters in Little Nicholas’s stories are exclusively boys. The female version was strictly the same as the original/male version except that the name of each character was replaced by a female name (e.g., Nicholas was replaced by Mary). To sum up, we used eight stories and for each story, we used an original/male version with only male main characters and a modified/female version with only female main characters.

To avoid any effect of the narrator's gender (Most, Sorber & Cunningham, 2007), stories were read and recorded on an audio format either by a man or a woman. Note that the same narrator recorded the story in both its original/male and its modified/female version. This audio format allowed us to control the emotional prosody of the narrator: The prosody was the same in all classes for each story. Furthermore, this audio format enabled us to avoid the influence of the narrator facial expression of emotion: children could not use the emotional facial expression of the narrator as a model to depict the facial cues in their drawings.

**Drawing task.** Each child had a pencil, a pencil sharpener and received a booklet consisting in eight drawing sheets (i.e., one per story). On each drawing sheet, the outline of a male character or a female character from the story had been printed. The characters' size and posture were always the same and the size of the faces' outline was large enough for children to easily and freely complete the facial cues of the character to depict his/her emotion. Figure 1 presents the models children had to complete in the drawing task.

- Insert Figure 1 here -

## **Procedure**

The study was conducted collectively, in class and during the scholar time. All children participated in four experimental sessions implemented weekly. Each full session lasted about 30 minutes. In each session, children were asked to listen to two stories and to perform two drawing tasks (i.e., one per story). Overall, children listened to eight stories: Four stories suggesting sadness and four stories suggesting anger. For each emotion, two stories were presented in the original/male version and two stories were presented in the modified/female version. Children listened to only one version of each story (i.e., original/male or modified/female version). The presentation of each story was counterbalanced across the two classes per age groups, one receiving the original/male

version and the other one receiving the modified/female version. The order of presentation of the stories was randomized and it was the same across all age groups.

Each child received a booklet from the experimenter; this booklet was used to collect the data in all the four sessions. In session 1, children were invited to carefully listen to a story recorded in audio format. They were informed that an exercise will occur during the story but no further information regarding the nature of the task was given to them. The experimenter stopped the recording after the emotional passage and named the emotion the character was feeling at this specific moment given the situation just described (e.g., "*Nicholas is sad*"). Then, the experimenter wrote this emotional label on the black board and children had to perform the drawing task. So, children did not have to infer the emotion felt by the character since the experimenter explicitly mentioned the emotional label. The drawing task consisted in completing the character's face in order to depict the emotion written on the blackboard. The following instruction was given to children: "Complete the face of [character's name] in order to see how he/she feels at this time, in other words, in order to see that he/she is sad/angry." To prevent any copying, the experimenter explained that the exercise would not be evaluated (no true or false answers) and made clear that what was interesting was each child's original point of view. Also, to encourage children in performing the drawing task individually, they were spaced in the classroom and supervised by both the experimenter and the teacher. After children had completed their drawing, the experimenter reminded them briefly of what had happened in the story up to that point and then continued playing the story. Then, children were asked to carefully listen to the second story and the same procedure was used. During sessions 2 to 4, the same procedure was repeated, with two different stories each time.

## **Results**

### **Proportion of correct drawings**

Following the example of numerous studies in the field of expressive drawing (e.g., Brechet, 2013; Brechet et al., 2009; Cox, 2005; Vendeville, Blanc & Brechet, 2015; Vendeville, Brechet & Blanc, 2015), the 1440 drawings (i.e., 180 participants, 8 drawings per participant) were individually evaluated regarding the emotion depicted. Judges were three female psychology students and were not provided with any information about the study's objectives or about children's age or gender. Judges evaluated drawings independently and they were not expert in children art. For each drawing, judges had to determine which emotion was depicted by choosing from a list of seven answers: happiness, sadness, anger, fear, surprise, other or neutral. When judges chose the category "other", they had to specify the emotion they identified in the drawings. The drawings were considered expressive and consensual if at least two of the three judges identified the same emotion. The drawings were considered non-consensual when no agreement was reached by judges on the emotion evoked. When the drawing was consensual and the target emotion was correctly identified (i.e., corresponded to the target emotion), we gave a score of 1 to this drawing. When the drawing was consensual but the target emotion was not identified or if judges selected the neutral answer, we gave a score of 0 to this drawing. Finally, when the drawing was non-consensual, we also gave a score of 0 to this drawing. The global inter-judge agreement was 87%.

We conducted two analyses of variance (i.e., one per emotion) on the proportion of correct drawings: age group (i.e., young versus old) and children's gender (i.e., boys versus girls) were between-subjects factors and character's gender (i.e., male versus female) was a within-subject factor. Though the use of parametric tests on binary data can seem unconventional, prior studies revealed that this type of analysis can be calculated under some conditions (Greer & Dunlap, 1997; Lunney, 1970). For instance, it is allowed when the number of degrees of freedom of the error term is above 40. In our study, these conditions are

fulfilled. For sadness, this analysis only revealed a main effect of age group,  $F(1, 176) = 9.434, p < .01, n^2_p = .051$ . Older children's proportion of correct drawings was higher ( $M = .93; SD = .18$ ) than younger children's ( $M = .84; SD = .30$ ). There was no significant effect of children's or character's gender. For anger, the analysis revealed a significant main effect of age group,  $F(1, 176) = 7.364, p < .01, n^2_p = .040$ . Older children ( $M = .76; SD = .37$ ) obtained a higher proportion of correct drawings than younger children ( $M = .64; SD = .39$ ). This analysis also indicated a main effect of children's gender,  $F(1, 176) = 6.046, p < .05, n^2_p = .033$ . Boys ( $M = .76; SD = .35$ ) produced a higher proportion of correct drawings than girls ( $M = .65; SD = .41$ ).

To sum up, results indicate that older children produced more correct drawings than younger children, whatever the emotion they had to depict. Boys produced more drawings depicting the target emotion than girls in response to the angry stories. However, there was no significant difference between boys and girls in response to the sad stories and there was no difference between male and female characters in response to the angry and sad stories.

### **Facial cues used to depict sadness and anger in the correct drawings**

Following the example of numerous studies (e.g., Brechet & Jolley, 2014; Brechet et al., 2007; Jolley et al., 2004), correct drawings were then subjected to a content analysis, consisting in identifying the graphic cues produced by children in order to depict the target emotions in their drawings. The 1140 drawings previously evaluated as correct were separated into two sets relating to each emotion (i.e., sadness: 638 drawings; anger: 503 drawings). Note that the drawings judged as incorrect in the prior analysis were not taken into account here, in order to improve the sensitivity of this content analysis. Two new adult judges (i.e., different from the ones who rated the drawings in the prior analysis) were asked to independently review all the facial cues depicted in the drawings and to generate a list for each emotion. These two judges were psychology students (a male and a female) and were not

provided with any information about the study's objectives nor informed about children's age or gender. The two judges were then asked to pool and discuss their lists of facial cues in order to generate a shared list. For sadness, the following cues were generated: eyes (straight, circular, other), eyebrows (outward, curved, other), mouth (downturned, straight, other), number of tears (0, 1 to 2, more than 2) and size of tears (small versus large, i.e., inferior/equal or superior to three millimeters). For anger, the following cues were generated: eyes (straight, circular, other), eyebrows (inward, curved, other), mouth (downturned, straight, other), number of teeth (0, 1 to 13, more than 13) and other (i.e., cheeks and outgoing lines of the head or ears). Finally, the judges noted the number of correct drawings representing each facial cue.

**Number of facial cues.** First, we examined whether the number of facial cues differed according to children's age, children's gender and character's gender. Note that children produced between 1 and 6 facial cues to depict either sadness or anger.

For each emotion, an analysis of variance was conducted on the number of facial cues: age group (i.e., young versus old) and children's gender (i.e., boys versus girls) were between-subjects factors and character's gender (i.e., male versus female) was a within-subject factor. For sadness, this analysis revealed a significant main effect of children's gender,  $F(1, 630) = 5.408, p < .05, \eta^2_p = .009$ . Girls ( $M = 4.25; SD = .75$ ) produced more facial cues than boys ( $M = 4.10; SD = .77$ ). This effect is subsumed by the interaction between age group and children's gender,  $F(1, 630) = 5.663, p < .05, \eta^2_p = .009$ , showing that the difference between boys and girls is only observed with older children. For anger, the analysis only revealed a significant interaction between age group and children's gender,  $F(1, 495) = 6.765, p < .01, \eta^2_p = .013$ , with younger boys producing more facial cues ( $M = 3.44; SD = .72$ ) than older boys ( $M = 3.23; SD = .69$ ). To sum up, girls especially the older ones

produced more facial cues than boys to depict sadness and younger boys produced more facial cues than older boys to depict anger.

**Type of facial cues.** In order to examine whether boys and girls produced different types of facial cues to depict sadness and anger, we compared the number of boys and girls depicting each facial cue by using Fisher exact probability tests, with an alpha level of .05. We conducted this comparison for each age group and for each character's gender (see Table A1 for sadness and Table A2 for anger).

**Sadness.** Among children who correctly depicted sadness in their drawings, more girls depicted straight eyes (223/356, 63%) than boys (82/282, 29%), whereas more boys depicted circular eyes (170/282, 60%) than girls (102/356, 29%). These differences are significant for each age group and character's gender. For eyebrows, more girls depicted curved eyebrows (102/356, 29%) than boys (42/282, 15%), except younger children when the character was a male. And more younger boys depicted outward eyebrows (23/150, 15%) than younger girls (4/155, 3%), whatever the character's gender. For mouth, there was a significant difference only with younger children and when the character was a female. In this condition, more younger girls depicted downturned mouth (61/76, 80%) than younger boys (41/73, 56%), whereas more younger boys depicted straight mouth or other mouth (respectively, 13/73, 18%; and 19/73, 26%) than younger girls (respectively, 5/76, 7%; and 10/76, 13%). Regarding the number of tears, more girls depicted more than two tears (227/356, 64%) than boys (129/282, 46%), whatever the age group or the character's gender. On the contrary, more boys depicted less than two tears (60/139, 43%) than girls (44/176, 25%), this difference was significant within each age group but only when the character was a female. Finally, regarding the size of tears, more older girls depicted small tears (118/201, 59%) than older boys (47/132, 36%) whereas more older boys depicted large tears (69/132, 52%) than older girls (70/201, 35%), whatever the character's gender.



To sum up, most of boys depicted sadness through circular eyes and a few large tears, whereas most of girls depicted this emotion through straight eyes, curved eyebrows and a lot of small tears. Furthermore, some additional differences between boys and girls were especially observed within the younger group. Indeed, most of younger boys depicted sadness through outward eyebrows and a straight mouth, whereas most of younger girls depicted this emotion through a downturned mouth. Figure 2 illustrates the noticeable differences in the facial cues used by boys versus girls to depict sadness in their drawings.

- Insert Figure 2 here -

Anger. Among children who correctly depicted anger in their drawings, more girls depicted straight eyes (137/260, 53%) than boys (60/243, 25%) whereas more boys depicted circular eyes (141/243, 58%) than girls (82/260, 32%). These differences are significant whatever the age group or the character gender. For eyebrows, more girls depicted other eyebrows (e.g., circumflex eyebrows) (15/138, 11%) than boys (5/119, 4%), but only when the character was a female. There was no significant difference between boys and girls regarding the shape of the mouth. For the number of teeth, girls were more likely not to depict teeth (191/260, 73%) than boys (138/243, 57%) except for younger children when the character was a female. And younger boys were more likely to depict more than 13 teeth (17/119, 14%) than younger girls (1/114, 1%) whatever the character's gender. Regarding the "other" theme, more older girls depicted cheeks (13/146, 9%) than older boys (1/124, 1%), whatever the character's gender. Finally, more older girls depicted outgoing lines of the head or ears (13/70, 19%) than older boys (3/62, 5%), when the character was a male.

To sum up, most of boys depicted anger through circular eyes and a lot of teeth, whereas most of girls depicted this emotion using straight eyes, other eyebrows (e.g., circumflex) and no teeth. Some additional differences between boys and girls were especially observed within the older group. Indeed, most of older girls depicted anger by adding cheeks

or outgoing lines of the head or ears. Figure 3 illustrates the noticeable differences in the facial cues used by boys versus girls to depict anger in their drawings.

- Insert Figure 3 here -

### **Discussion**

The aim of this study was to examine the influence of both children's and character's gender on the facial depiction of two gendered emotions: sadness and anger. To this end, 7 to 10 years-old children were asked to listen to fictional stories and to depict in the face of a character (a male versus a female) either sadness or anger according to the emotion suggested in the story and mentioned by the experimenter. Children's drawings were categorized as correct versus incorrect (depending on how recognizable their facial depiction of the target emotion was). The correct drawings were then subjected to a content analysis so as to determine which facial cues were used to depict sadness and anger and more importantly whether children's use of these cues depended on their gender and on the character's gender.

First, we examined the influence of gender on the correct facial depiction of sadness and anger. Consistent with prior studies, we found an age-related improvement in children's ability to depict sadness and anger. Regarding gender, our results revealed no effect of children's gender on the correct depiction of sadness. This result is likely to be due to a ceiling effect, considering that even young children produced more than 85% of correct sad drawings. These results are in accordance with the literature on the development of both emotional knowledge and expressive drawings. Indeed, children from the age of 4 are already able to recognize, understand and infer sadness from a story (Blanc, 2014; Camras & Allison, 1985; Deconti & Dickerson, 1994; Thompson, 1987; Widen & Russell, 2003) and their graphic skills allow them to depict this emotion in their drawing from the age of 5, since depicting sadness mainly requires to draw a downturned mouth (Brechet et al., 2007). On the other hand, there was an effect of children's gender on the correct depiction of anger: Boys

produced a higher number of correct angry drawings than girls. This difference is in accordance with those observed when children are asked to infer emotions from a story, showing that boys are more likely to infer anger than girls (Brechet, 2013; Parmley & Cunningham, 2008). However, this finding is more surprising in the present study in which the emotional label was explicitly given to children in order to prevent potential understanding difficulties. Despite this methodological subtlety, it is possible that children construct their own interpretation of the emotional situation regardless of the emotional label mentioned by the experimenter, this representation influencing the way they depicted it in their drawings. This result could also be connected to studies showing that boys tend to draw more aggressive and violent themes than girls in their spontaneous drawings (Feinburg, 1977; Flannery & Watson, 1995; Silver, 1993; Tuman, 1999). Finally, this result could also be in line with studies conducted on adults and showing that women have a tendency to cry in response to anger (see Vingerhoets, Cornelius, Van Heck & Becht, 2000 for a review). In our study, some girls may have depicted tears in their drawing to express anger but judges evaluated these drawings as sadness because of the depiction of tears. Note that the correct depiction of sadness and anger did not reveal any effect of the character's gender.

Second, we examined the influence of gender on the type of facial cues used by children. In accordance with our hypotheses, the use of some facial cues seems to differ according to children's gender. Independently of the emotion children have to depict, boys and girls seem to represent the eyes differently in their drawings. Indeed, boys tended to depict circular eyes whereas girls tended to depict straight eyes. To our knowledge, no study has yet examined the influence of gender on the shape of the eyes in children's drawings. Then, the difference reported in the present study could be specific to the depiction of negative emotions such as sadness and anger but it could also occur more widely in children's drawings of faces. These hypotheses would require further investigation to determine the

origins of this difference. For sadness, our results showed that there was an effect of children's gender on the way they depicted the character's eyebrows and tears. Boys tended to depict sadness with outward eyebrows whereas girls tended to depict this emotion with curved eyebrows. Boys were also more likely to represent the sad character with a few large tears whereas girls tended to represent the sad character with a lot of small tears. Additionally, our results revealed that overall older girls used a higher number of facial cues than older boys to depict sadness. For anger, our results revealed that whereas boys tended to add teeth in their angry drawings, girls did not. To depict this emotion, girls tended to add other facial cues like cheeks or lines outgoing the head or ears. Note that the character's gender did not seem to really influence the way sadness and anger was depicted. Thus, children's gender appeared as the most important factor in this study. These findings can be interpreted in light of the social representation children built about these emotions. In accordance with gender-emotion stereotypes and display rules, children learn very early to differentiate emotions which are stereotypically feminine or masculine and to either mask or attenuate the expression of emotions which does not comply with their own gender (McNaughton, 2000; Saarni, 1979). Thus, in occidental cultures, boys learn that they should not over emphasize sadness whereas they can freely display anger. On the contrary, girls learn that they can display sadness in a very expressive, even emphasized way whereas they should attenuate or even dissimulate their expression of anger. From this daily experience, it is plausible that children create their own prototypical representation of emotions and how to express them, depending on their gender. Their graphic depiction of emotions could thus correspond to this prototypical representation, explaining why the variation in the use of facial cues was highly linked to children's gender and very poorly linked to the character's gender. In other words, children may depict gendered emotions in the same way in a male or a female character but differently depending on the fact that the drawer is a boy or a girl. The emotional depiction

would be linked to display rules and gender-emotion stereotypes conveyed by the culture. So, in another culture, we could observe the use of other combinations of facial cues in order to depict these same emotions. For example, in Asian cultures where the pain is less expressed (Ekman et al., 1987), the difference between boys and girls in the depiction of sadness might be reduced, with children depicting for instance only a downturned mouth and no tears. These hypotheses require further investigations.

To conclude, the present study is the first one to investigate the influence of both children's and character's gender on the facial cues used by children to depict gendered emotions. Our findings are consistent with gender-emotion stereotypes, showing an influence of children's gender on the way they depict sadness and anger in their drawings. Gender-emotion stereotypes can be transmitted through numerous sources (e.g., parental discourse, books, television, school, etc.) (Aznar & Tenenbaum, 2015; Tepper & Cassidy, 1999). In the present study, we did not directly assess children's own reliance on these stereotypes or the potential influence of their environment. We did not either assess children's graphic skills or emotional understanding. These could be interesting additional measures in future research, so as to have a more precise picture of individual differences that could occur when considering the effect of gender on children's expressive drawings. Furthermore, our results add to the existing literature suggesting that clinicians should interpret children's expressive drawings cautiously (Bekhit, Thomas & Jolley, 2005; Watkins, Campbell, Nieberding & Hallmark, 1995). More precisely, our findings highlight the importance of taking the influence of gender into account. For instance, according to our results, a boy could depict his sadness with only few tears and a girl could depict her anger with only a downturned mouth. In addition, it would be interesting to examine whether children are able to modulate their emotional depiction as a function of the intensity of the emotion felt in a given situation. Because the emotional intensity of fictional stories had been controlled in the present study,

its influence cannot be examined on the depiction of sadness and anger. Future research could ask children to evaluate the intensity of the emotion corresponding to the situation described in the story and/or to judge the intensity of their own depiction of the emotion in the drawings. Moreover, in our study, we selected the stories on the basis of a pre-test conducted on adults in order to be sure that the emotional passages suggested the target emotion. However, it could also be interesting to conduct this pre-test on children to examine to what extent their judgment is similar or not to adults' judgment. Finally, this study highlights one educational challenge that would consist in minimizing the influence of the gender-emotion stereotypes, with boys and girls feeling free to express sadness and anger regardless of gender related social standards.

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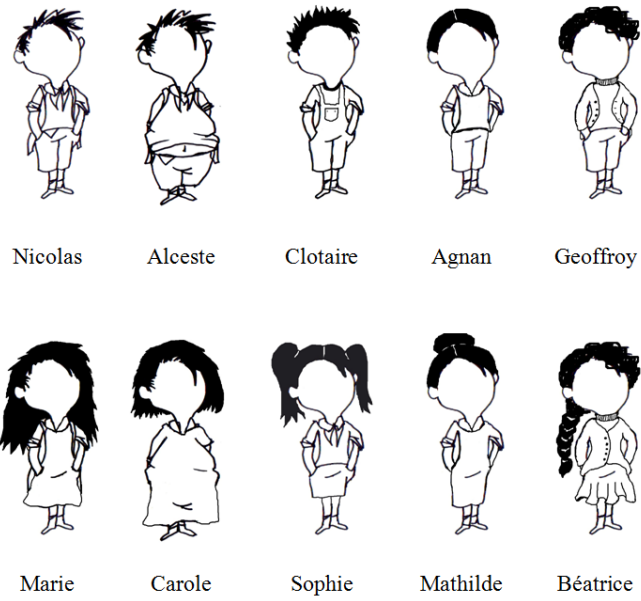


Figure 1. *Models children were asked to complete in the drawing task*

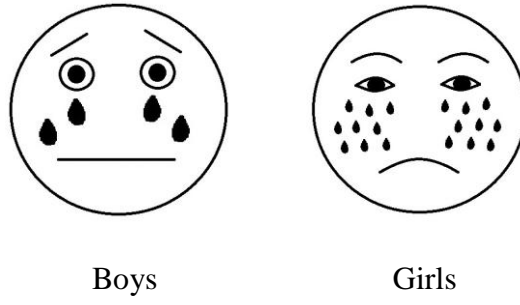


Figure 2. *Differences in the facial cues used by boys versus girls to depict sadness in their drawings*



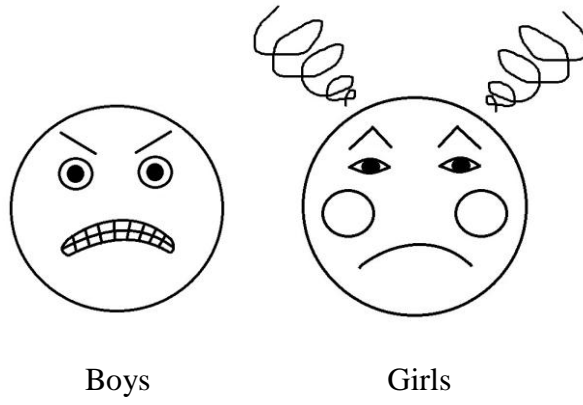


Figure 3. *Differences in the facial cues used by boys versus girls to depict anger in their drawings*

**APPENDIX: Number and percentage of correct drawings depicting each facial cue as a function of age group, character's gender and children's gender for each emotion**

Table 1. *Number (and percentage) of correct drawings depicting each facial cue as a function of age group (young vs old), character's gender (male vs female) and children's gender (boys vs girls) for sadness*

Facial cues		Younger children				Older children				All children			
		Male		Female		Male		Female		Male		Female	
		B	G	B	G	B	G	B	G	B	G	B	G
Eyes	Straight	20 (26)	44 (56)	16 (22)	48 (63)	25 (38)	67 (66)	21 (32)	64 (64)	45 (31)	111 (62)	37 (27)	112 (64)
	Circular	50 (65)	32 (41)	52 (71)	22 (29)	33 (50)	26 (26)	35 (53)	22 (22)	83 (58)	58 (32)	87 (63)	44 (25)
	Other	7 (9)	3 (4)	5 (7)	6 (8)	8 (12)	8 (8)	10 (15)	14 (14)	15 (10)	11 (6)	15 (11)	20 (11)
Eyebrows	Outward	14 (18)	4 (5)	9 (12)	0 (0)	5 (8)	6 (6)	4 (6)	6 (6)	19 (13)	10 (6)	13 (9)	6 (3)
	Curved	18 (23)	16 (20)	9 (12)	26 (34)	6 (9)	34 (34)	9 (14)	26 (26)	24 (17)	50 (28)	18 (13)	52 (30)
	Other	8 (10)	7 (9)	7 (10)	4 (5)	6 (9)	9 (9)	7 (11)	10 (10)	14 (10)	16 (9)	14 (10)	14 (8)
Mouth	Downturned	51 (66)	56 (71)	41 (56)	61 (80)	42 (64)	58 (57)	46 (70)	65 (65)	93 (65)	114 (63)	87 (63)	126 (72)
	Straight	8 (10)	6 (8)	13 (18)	5 (7)	8 (12)	18 (18)	4 (6)	12 (12)	16 (11)	24 (13)	17 (12)	17 (10)
	Other	18 (23)	17 (22)	19 (26)	10 (13)	16 (24)	25 (25)	16 (24)	23 (23)	34 (24)	42 (23)	35 (25)	33 (19)
Tears – Number	0	12 (16)	8 (10)	9 (12)	9 (12)	7 (11)	5 (5)	9 (14)	8 (8)	19 (13)	13 (7)	18 (13)	17 (10)
	1 to 2	30 (39)	22 (28)	32 (44)	16 (21)	26 (39)	33 (33)	28 (42)	28 (28)	56 (39)	55 (31)	60 (43)	44 (25)
	More than 2	35 (45)	49 (62)	32 (44)	51 (67)	33 (50)	63 (62)	29 (44)	64 (64)	68 (48)	112 (62)	61 (44)	115 (65)
Tears – Size	Small	22 (29)	32 (41)	25 (34)	31 (41)	22 (33)	59 (58)	25 (38)	59 (59)	44 (31)	91 (51)	50 (36)	90 (51)
	Large	43 (56)	39 (49)	39 (53)	36 (47)	37 (56)	37 (37)	32 (48)	33 (33)	80 (56)	76 (42)	71 (51)	69 (39)
Total number of correct drawings		77	79	73	76	66	101	66	100	143	180	139	176

*Note:* For the character's gender, male characters are referred to as "Male" and female characters are referred to as "Female". Regarding children's gender, "B" stands for boys and "G" stands for girls.

Table 2. Number (and percentage) of correct drawings depicting each facial cue as a function of age group (young vs old), character's gender (male vs female) and children's gender (boys vs girls) for anger

Facial cues	Younger children				Older children				All children				
	Male		Female		Male		Female		Male		Female		
	B	G	B	G	B	G	B	G	B	G	B	G	
Eyes	Straight	14 (23)	30 (58)	11 (19)	33 (53)	16 (26)	32 (46)	19 (31)	42 (55)	30 (24)	62 (51)	30 (25)	75 (54)
	Circular	42 (68)	19 (37)	35 (61)	22 (35)	34 (55)	22 (31)	30 (48)	19 (25)	76 (61)	41 (34)	65 (55)	41 (30)
	Other	6 (10)	3 (6)	11 (19)	7 (11)	12 (19)	16 (23)	13 (23)	15 (20)	18 (15)	19 (16)	24 (20)	22 (16)
Eyebrows	Inward	45 (73)	32 (62)	40 (70)	42 (68)	39 (63)	51 (73)	37 (60)	56 (74)	84 (68)	83 (68)	77 (65)	98 (71)
	Curved	4 (6)	5 (10)	8 (14)	5 (8)	1 (2)	5 (7)	5 (8)	8 (11)	5 (4)	10 (8)	13 (11)	13 (9)
	Other	8 (13)	6 (12)	3 (5)	10 (16)	3 (5)	6 (9)	2 (3)	5 (7)	11 (9)	12 (10)	5 (4)	15 (11)
Mouth	Downturned	24 (39)	27 (52)	28 (49)	27 (44)	34 (55)	36 (51)	29 (47)	34 (45)	58 (47)	63 (52)	57 (48)	61 (44)
	Straight	25 (40)	18 (35)	21 (37)	28 (45)	14 (23)	15 (21)	16 (26)	21 (28)	39 (31)	33 (27)	37 (31)	49 (36)
	Other	13 (21)	7 (13)	8 (14)	7 (11)	14 (23)	19 (27)	17 (27)	21 (28)	27 (22)	26 (21)	25 (21)	28 (20)
Teeth – Number	0	37 (60)	40 (77)	34 (60)	45 (73)	33 (53)	50 (71)	34 (55)	56 (74)	70 (56)	90 (74)	68 (57)	101 (73)
	1 to 13	17 (27)	12 (23)	14 (25)	16 (26)	17 (27)	14 (20)	19 (31)	15 (20)	34 (27)	26 (21)	33 (28)	31 (22)
	More than 13	8 (13)	0 (0)	9 (16)	1 (2)	12 (19)	6 (9)	9 (15)	5 (7)	20 (16)	6 (5)	18 (15)	6 (4)
Other	Cheeks	5 (8)	3 (6)	3 (5)	7 (11)	0 (0)	5 (7)	1 (2)	8 (11)	5 (4)	8 (7)	4 (3)	15 (11)
	Outgoing lines of the head or ears	3 (5)	4 (8)	4 (7)	2 (3)	3 (5)	13 (19)	5 (8)	6 (8)	6 (5)	17 (14)	9 (8)	8 (6)
Total number of correct drawings		62	52	57	62	62	70	62	76	124	122	119	138

Note: For the character's gender, male characters are referred to as "Male" and female characters are referred to as "Female". Regarding children's gender, "B" stands for boys and "G" stands for girls .