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Brief Report

The development of emotion concepts: A story superiority effect in older children and adolescents



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ABSTRACT

Contrary to traditional assumptions, young children are more likely to correctly label someone's emotion from a story that describes the causes and consequences of the emotion than from the person's facial expression. This *story superiority effect* was examined in a sample of older children and adolescents ($N = 90$, 8–20 years) for the emotions of fear, disgust, shame, embarrassment, and pride. Participants freely labeled the emotion they inferred from a story describing a cause and consequence of each emotion and, separately, from the corresponding facial expression. In each of five age groups, the expected emotion label was used for the emotion story significantly more than for the corresponding facial expression (except for pride). The story superiority effect is strong from childhood to early adulthood and opens the door to new accounts of how emotion concepts develop.

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Introduction

From an early age, children need to recognize the emotions they experience or witness. Recognition is based on conceptual categories—fear, anger, joy, and so on—and, in turn, influences how the emotion is thought about, responded to, and remembered. The current study is part of a larger project

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on the nature of emotion conceptual categories and how they develop. One theory of emotion recognition assumes that human nature includes an emotion signaling system (Izard, 1971, 1994), and evidence has been offered that at birth or shortly thereafter infants recognize emotions from facial expressions (Haviland & Lelwica, 1987; Walker-Andrews, 2005). Developmental accounts of emotion understanding thus suggested that facial expressions are powerful cues, especially prior to acquisition of language, to emotion recognition and might be the initial building blocks of emotion conceptual categories (Denham, 1998; Harris, 1993; Pons, Harris, & de Rosnay, 2004).

We are developing an alternative—the emotion scripts view (Widen, 2014; Widen & Russell, 2004, 2010a; see also de Rosnay, Harris, & Pons, 2008). On this view, there is no innate emotion signaling system. Instead, emotion conceptual categories are scripts that, in adult form, include the various cues to emotion in a causal and temporal order. The script is acquired gradually over the course of development. One implication of the script view is that emotion understanding is not unitary but rather involves different cues at different ages. The different cues to emotion are added throughout development, and facial expression need not be the earliest or strongest cue. Instead, for some emotions, the strongest cue is information about their causes and, somewhat later, the appraisal of those causes. For other emotions, the strongest cue is information about their consequences. For yet other emotions, the strongest cue is facial expressions. For example, happiness might be initially recognized from a smile, fear from a frightening cause, and anger from aggressive behavioral consequence. In support, several recent studies found that, for young children (3–11 years), stories describing an emotion's cause and consequence proved to be better cues to emotion categorization than facial expressions (Balconi & Carrera, 2007; Nelson, Hudspeth, & Russell, 2013; Russell & Widen, 2002; Smith & Walden, 1999; Widen & Russell, 2010a). The current study examined this *story superiority effect* in older children and adolescents.

Research on the relative power of stories has been limited to children and primarily to basic emotions. The story superiority effect may be reversed for adolescents and a wider variety of emotions. A handful of studies have assessed adolescents' understanding of facial expressions (Herba, Landau, Russell, Ecker, & Phillips, 2006; Lenti, Lenti-Boero, & Giacobbe, 1999; Montirosso, Peverelli, Frigerio, Crespi, & Borgatti, 2010). The general finding is that adolescents are more likely than younger children to use the expected emotion label for facial expressions (but see Montirosso et al., 2010). No research, to our knowledge, has compared the relative influence of different cues on adolescents' emotion recognition. The current study did so for five emotions: fear, disgust, embarrassment, shame, and pride. Because adolescents improve in labeling the emotion of faces, perhaps the story superiority effect diminishes or disappears, but no strong hypotheses are warranted by extant findings.

The current study followed in the footsteps of a prior study that found that children (4–10 years) were more likely to use the expected label for cause-and-consequence stories than for facial expressions overall (Widen & Russell, 2010a). This effect held for fear, disgust, embarrassment, shame, and compassion. The current study sought to extend the story superiority effect to older children and adolescents. Participants (8–20 years) freely labeled emotions from stories and, separately, from facial expressions of fear, disgust, shame, embarrassment, and pride.

Method

Participants

A total of 90 participants (42 males; 8–20 years; 80.0% Caucasian, 6.7% Hispanic, 4.4% Asian, 1.1% Pacific Islander, 1.1% African American, and 6.7% other/did not report) were recruited from the greater Boston area in the northeastern United States. The sample was divided into five equal groups ($n = 18$ each): 8- and 9-year-olds ($M = 8.50$ years, $SD = 0.51$; 9 males), 10- and 11-year-olds ($M = 10.56$ years, $SD = 0.51$; 9 males), 12- to 14-year-olds ($M = 12.67$ years, $SD = 0.70$; 9 males), 15- to 17-year-olds ($M = 16.17$ years, $SD = 0.92$; 9 males), and 18- to 20-year-olds ($M = 19.06$ years, $SD = 0.72$; 6 males). (Analyses of gender effects are available in the online [supplementary material](#).)

Materials

Photographs of facial expressions

Photographs of prototypical facial expressions posed by Caucasian females were selected from two sets. The pride, shame, and embarrassment photos were from the University of California, Davis, Set of Emotion Expressions (Tracy, Robins, & Schriber, 2009). The fear and disgust photos were from the Amsterdam Dynamic Facial Expression Set (van der Schalk, Hawk, Fischer, & Doosje, 2011). Photos in both sets were based on and coded with the Facial Action Coding System (Ekman, Friesen, & Hager, 2002). We equated photos for size, shape, and color.

Stories of causes and consequences of emotions

The story for each emotion (fear, disgust, pride, shame, or embarrassment) included a cause and a consequence (see Appendix B) and was developed based on prior studies in our lab where children generated stories about the causes or consequences for different emotions (Russell & Widen, 2002; Widen & Russell, 2003, 2004, 2010a,c). Pilot testing showed that a majority of adults ($n = 20$; $M_{\text{age}} = 35.1$ years, $SD = 13.4$) freely labeled each type of story with the predicted emotion: 100.0% for embarrassment, 95.0% for fear, 95.0% for disgust, 65.0% for shame, and 55.0% for pride.

Procedure

Participants were told, “This is a study about feelings—like when you feel happy or sad. In this study, you will see facial expressions and read stories describing the cause and consequence of an emotion. You will be asked to write down how the person feels in each facial expression and each story. For each one, please use only one word if you can.” The face trials were blocked together, as were story trials, and within each block the stimuli were presented one at a time in one of two random orders. For younger children (8–11 years), the experimenter read each story and question. Older participants independently read the stories and questions. All participants first completed a practice (and potential gatekeeper) happy story trial. To be included in the sample, participants needed to label the happy story as *happy* (or a close synonym). No participants were excluded for labeling the happy story incorrectly. Participants were then randomly assigned to receive faces or stories first. Thus, each participant completed 11 trials in total (1 happy gatekeeper trial, 5 face trials, and 5 story trials). On each trial, participants were asked, “How does Lisa/Julia feel?” and could respond with any word they wanted.

Scoring

Participants were allowed to use any label they wanted. The scoring key used in this study was drawn from Widen and Russell (2003, 2010a) and based on ratings of two judges blind to the source of the labels. The following labels were counted as correct: for happiness, *excited, good, glad, happy, and loved*; for fear, *afraid, alarmed, freaked out, frightened, horrified, nervous, panicked, scared, terrified, threatened, and worried*; for embarrassment, *embarrassed, humiliated, mortified, shy, and uncomfortable*; for disgust, *disgusted, grossed out, queasy, and sick*; for shame, *ashamed, guilty, and shame*; and for pride, *accomplished, boastful, confident, content, gratified, in charge, pride, satisfied, satisfaction, successful, superior, and triumphant*. In addition, labels that did not correspond to the target categories but did correspond to other emotion categories were as follows: for sadness, *sad*; for anger, *angry* and *mad*; for surprise, *surprised* and *shocked*; and for compassion, *sorry*. Responses could vary from what was just listed in syntax (e.g., *disgust, disgusted*) or by being embedded in a phrase (e.g., *very disgusted*). These were all of the labels used in the current study that came close to specifying one of the target emotions.

In total, participants had 900 total chances (90 participants \times 10 trials) to provide a label. Of these, 518 (57.6%) were the predicted emotion category for the given stimulus, 351 (39.0%) were an emotion

category but not the predicted one for the stimulus, and 31 (3.4%) could not be coded as an emotion category (e.g., *mischievous*, *powerful*, *sly*) or were non-responses.

Results and discussion

Relative power of stories versus faces to tap emotion concepts

The stories were more powerful cues to emotion than were the faces. Support for this conclusion was found in a mixed-design analysis of variance (ANOVA) where age group (five levels: 8 and 9 years, 10 and 11 years, 12–14 years, 15–17 years, or 18–20 years) and order of presentation (four levels) were between-participants factors and mode of presentation (two levels: story or facial expression) and emotion (five levels: fear, embarrassment, disgust, shame, or pride) were within-participant factors. The dependent variable was whether or not the participant used the target label for each story or face, coded 1 or 0. There were no significant main or interactive effects for order of presentation.

Fig. 1 illustrates the effects for mode of presentation and emotion. The main effect for mode was significant, $F(1, 70) = 11.07$, $p < .001$, partial $\eta^2 = .63$, and supported the story superiority effect; participants were significantly more likely to use the expected label for the stories (70.9%) than for the faces (44.2%). The main effect for emotion was also significant, $F(4, 280) = 29.50$, $p < .001$, partial $\eta^2 = .30$. The rank order for emotion (from highest to lowest) was fear (76.7%), pride (65.0%), disgust (60.0%), embarrassment (53.3%), and shame (32.8%). These main effects were moderated by the significant Mode of Presentation \times Emotion interaction, $F(4, 280) = 36.00$, $p < .001$, partial $\eta^2 = .34$. A series of paired-sample t tests showed that the overall story superiority effect occurred for four of the five emotions. Participants were significantly ($ps < .01$) more likely to use the expected label for the fear, embarrassment, shame, and disgust stories than for the corresponding faces. This pattern was reversed for pride ($p < .001$).

The main effect for age was significant, $F(4, 70) = 6.05$, $p < .001$, partial $\eta^2 = .26$. As age increased, participants were more likely to use the expected label: 8- and 9-year-olds (45.6%), 10- and 11-year-olds (56.1%), 12- to 14-year-olds (50.6%), 15- to 17-year-olds (65.0%), and 18- to 20-year-olds (70.6%). The main effects for age and emotion were moderated by the significant Age \times Emotion interaction, $F(16, 280) = 2.12$, $p = .01$, partial $\eta^2 = .11$. In follow-up one-way ANOVAs for each emotion separately, the increase with age was significant only for disgust, $F(4, 85) = 6.93$, $p < .001$, partial $\eta^2 = .25$, and shame, $F(4, 85) = 6.59$, $p < .001$, partial $\eta^2 = .24$. A post hoc LSD (least significant difference) test showed that for disgust, 15- to 17-year-olds and 18- to 20-year-olds used the expected label

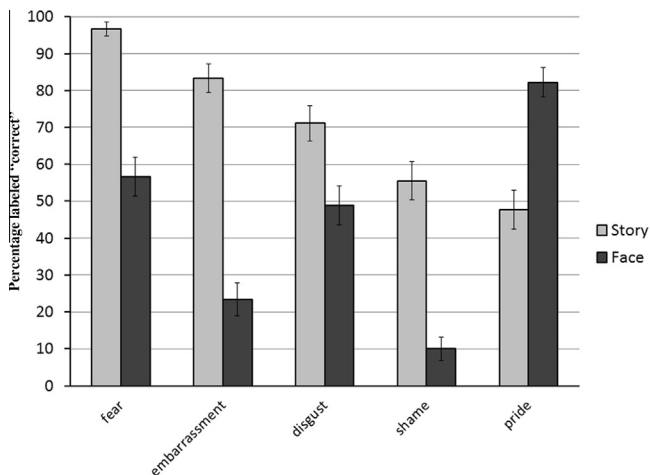


Fig. 1. Percentage of participants who used the expected label for each mode (story or face) for each emotion.

significantly more than the three younger age groups ($p < .05$) but did not differ from each other. Shame showed the same pattern.

In follow-up ANOVAs, the story superiority effect was assessed separately for disgust and shame (see tables in [Supplementary material](#) for means). The question of interest was whether the story superiority effect replicated at each age for each of these emotions. For disgust, the main effect for mode was significant, $F(1, 85) = 9.98$, $p = .002$, partial $\eta^2 = .11$, and did not interact significantly with age, $F(4, 85) = 1.20$, $p = .32$. For shame, the main effect for mode was significant, $F(1, 85) = 72.35$, $p < .01$, partial $\eta^2 = .16$, and interacted marginally with age, $F(4, 85) = 2.30$, $p = .07$. The advantage of story over face was significant for each age group ($p < .03$), and the advantage for the story increased with age. Thus, for both disgust and shame, the story superiority effect replicated at each age.

Valence-based “errors” for story and face

Of the 382 errors, 306 were scorable as to valence. The proportion of same valence errors (92.8%) greatly exceeded the proportion of opposite valence errors (7.2%). This predominance held for errors in the story condition (98.1% same valence, 1.9% opposite valence) and in the face condition (89.9% same valence, 10.1% opposite valence). This predominance held for positive stimulus conditions (pride: 96.4% same valence, 3.6% opposite valence) and for negative stimulus conditions (92.0% same valence, 8.0% opposite valence). The last finding speaks against the interpretation that same valence errors are exaggerated because there were more negative response options than positive ones.

General conclusion

Overall, we found that story was a better cue to emotion than facial expression. A story superiority effect occurred in all age groups tested, just as it did in prior studies of younger children ([Balconi & Carrera, 2007](#); [Nelson et al., 2013](#); [Smith & Walden, 1999](#); [Widen & Russell, 2002, 2010a](#)). The rank order of the relative strength of story over face was (from largest to smallest) embarrassment, shame, fear, and disgust; the effect was reversed for pride. The superiority of stories over faces is especially impressive given that the facial expressions used here were drawn from carefully developed and standardized sets, which in turn were based on decades of prior research selecting those faces most likely to be labeled as predicted. In contrast, our set of stories was drawn from several recent studies without a selection process other than the current experimenters' judgments. The story superiority effect speaks against the assumption that emotion conceptual categories are unitary; instead, children can have knowledge of the cause/consequence of an emotion but not of its facial expression or vice versa.

Pride was the only emotion in the current study for which a face superiority effect was found. Unlike other emotion stories, “correct” labeling of the pride story did not steadily increase with age, and it was the only story labeled below 50% in the 18- to 20-year-old age group (see [Supplementary material](#)). Instead, the pride story was labeled as *happy* by the majority of participants, and *happy* might well be considered correct. In addition, the word *happy* was used in the general instructions, which might have primed or encouraged the use of *happy*. Indeed, the pride story we used here was labeled “correctly” by the smallest proportion of adults of any of the stories used. It is possible that other pride stories may be more likely to be labeled as *proud*—perhaps stories with externally acknowledged achievements (e.g., a father telling his daughter that she was a big girl for helping him to fix her bike; [Nelson et al., 2013](#)) rather than an individual achievement. Individual achievement without external acknowledgment may evoke pride, but the current study demonstrates that it is more readily associated with happiness.

One of our age groups, 8- and 9-year olds, had been included in a prior study ([Widen & Russell, 2010a](#)). In both studies, this age group was significantly more likely to use the expected emotion label for stories than for facial expressions even though somewhat different emotions were included. The 8- and 9-year-olds gave more “correct” responses (73%) to the stories in [Widen and Russell \(2010a\)](#) than they did in the current study (56%), bolstered by the inclusion of additional basic emotions (e.g., anger, surprise). In contrast, the difference for the faces was much smaller ([Widen & Russell, 2010a](#): 39%; current study: 35%) despite the inclusion of more basic emotions in [Widen and Russell \(2010a\)](#). This comparison indicates that the story superiority effect may vary as a function of the emotions tested but

that the impact of different emotions is on children's responses to the stories and not the faces, which was more modest in both studies.

Emotion scripts showed continuing development during adolescence for all of the emotion categories in the current study. First, "incorrect" responses were largely valence based. This pattern held for both stories and faces and for both positive and negative emotions. These results extend findings of the pattern of "incorrect" responses made by younger children (Widen & Russell, 2010a, 2010b). Second, at every age, participants were below ceiling for at least one cue (see [Supplementary material](#)). For example, the face was integrated into the script for different emotions at different ages; "correct" labeling of the disgust face (and to a lesser degree the shame face) rapidly increased from the 12- to 14-year-old age group to the 15- to 17-year-old age group, whereas recognition of the pride face increased more gradually. Further research on adolescents' emotion concepts, less-studied emotions such as embarrassment, shame, and pride, and cues other than facial expressions is much needed and will add to the understanding of how these concepts develop during adolescence.

The current study was limited by the use of only one story and one facial expression for each emotion. Nonetheless, the predicted effects were significant, indicating that using only one of each was adequate. Future studies might use different and more stimuli. In addition, the finding that the story superiority effect was reversed for pride suggests that it might also be reversed for other emotions. Indeed, the effect was reversed for surprise for children (4–10 years; Widen & Russell, 2010a).

The power of stories about causes and consequences relative to that of faces encourages researchers to develop an account of how children and adolescents come to understand emotion that eschews the assumption that children automatically know the meaning of facial expressions and use that knowledge to build the rest of their knowledge about emotion (Denham, 1998; Harris, 1993; Pons et al., 2004). Part of that new account would reverse this assumption and explore how knowledge of causes and consequences helps children come to understand the face. For example, learning that the cause of disgust is often something that tastes or smells bad and that it often leads to spitting out or blocking an odor might help children to interpret a nose wrinkle (the standard facial expression of disgust) as indicating disgust (Widen & Russell, 2013). Another part of the new account would be details about just how causes and consequences are coded, whether as sets of exemplars or as more abstract patterns.

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Appendix B

Stories used for various emotions

| Emotion | Story |
|---------------|---|
| Happiness | Once upon a time, it was Lisa's birthday. All her friends came to her birthday party and gave her presents. Lisa jumped up and down and clapped her hands |
| Fear | One day, Lisa was walking down the street when a big dog started growling and chasing her. Lisa screamed and ran away as fast as she could |
| Disgust | One day, Lisa took a big bite of an apple. But it was rotten inside. It tasted awful. She spit it out as fast as she could and threw the apple on the ground. She did not want to touch it |
| Pride | One day, Julia ran a marathon. She competed against hundreds of other people. She had trained for it for a whole year. Finally, she won first place and got a medal |
| Embarrassment | One day, Julia spilled grape juice all over her white dress. Everyone laughed at her. Julia's face turned very red, and she looked away from everyone. She wished that she could hide |
| Shame | One day, Lisa was playing ball in the living room, which she knew was against the rules. Lisa bounced the ball and broke a lamp. Her dad came into the room, and Lisa could not look him in the eye |

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.jecp.2014.10.009>.

Appendix B

See Appendix B.

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