

Children's understanding of mixed emotions across cultures

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Abstract

This study investigated cross-cultural similarities and variations in children's developing understanding of mixed emotions. Four- to 9-year-old US ($n=56$) and Chinese ($n=98$) children listened to stories in which the protagonist encountered a situation combining positive and negative components. Children were asked whether the story protagonist would feel the appropriate positive emotion as well as the appropriate negative emotion. Despite being able to recall the positive and negative components of the stories, both US and Chinese children often agreed to only one emotion. However, when children did not agree to only one emotion, US children were more likely than Chinese children to agree to both emotions, whereas Chinese children were more likely than US children to deny both emotions. Overall, the findings confirm that the recognition of mixed emotions is challenging for children under the age of 10. They also suggest, however, that mixed emotions are conceptualized differently in the two cultures: US children tend to assume that positive and negative emotions can coexist whereas Chinese children tend to assume that they neutralize each other.

Keywords

Mixed emotions, emotion understanding, culture, children

Children's understanding of emotion (EU) embraces the nature, causes, and regulation of emotions. It involves the mastery of several conceptual components, including the understanding of belief-emotion (BE) connections—the understanding that a person's beliefs affect his or her emotional reactions to a situation (Bradmetz & Schneider, 1999; Hadwin & Perner, 1991), hidden emotion (HE)—the understanding that a person's felt emotion can differ from his or her expressed emotion (Gross & Harris, 1988; Harris et al., 1986), and mixed emotions (ME)—the understanding that conflicting emotions can be elicited by different aspects of the same situation (Harris, 1983; Harter & Buddin, 1987).

Cultural Similarities in the Development of Emotion Understanding

Subsequent cross-cultural research with specific components such as BE and HE has suggested that children's EU progresses similarly across different cultures. For example, Avis and Harris (1991) found that children of the Baka, a hunter-gatherer people in Cameroon, were able to predict a person's emotion based on his belief about the situation by the age of 4 to 5 years, thereby showing a similar development of BE to British children. In addition, Gardner et al. (1988) found that 6-year-old Japanese children were better at differentiating between a person's felt and expressed emotions than 4-year-old Japanese children, thereby showing a similar development of HE to British children. Aside from these cross-cultural similarities in the pattern of EU development, some studies also found cross-cultural variations in the rate of development. For example, Chinese preschoolers showed a better understanding

of HE as compared to their British and German peers (Tang et al., 2018). Indian preschool girls showed a better understanding of HE as compared to British preschool girls (Joshi & MacLean, 1994). Nevertheless, despite these variations, children across cultures show similar patterns of developmental change.

This cross-cultural similarity in children's EU development has been reinforced by findings with the Test of Emotion Comprehension (TEC), which measures nine components of EU among 3- to 11-year-old children (Pons et al., 2004). When the TEC was administered to 3- to 11-year-old British children (Pons et al., 2004), 3- to 6-year-old Italian and German children (Molina et al., 2014), and 4- to 6-year-old Chinese children (Tang et al., 2018), similar overall patterns of development were found in all four countries, suggesting a potentially similar pattern of EU development in early childhood across different cultures.

Lack of Cross-Cultural Research on Children's Understanding of Mixed Emotions

Despite these cross-cultural findings on the development of emotion understanding among young children, little cross-cultural research has examined development among older children,

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especially with respect to late-developing components, such as the understanding of mixed emotions. As noted, children's understanding of mixed emotions emerges in late childhood (Harris, 1983; Harter & Buddin, 1987; M. Peng et al., 1992). Previous studies with Western children have shown that children under the age of 10 have difficulty in understanding mixed emotions. For example, in Harris' (1983) study 2, British children aged 6 and 10 years heard stories that included both a positive and a negative component (e.g., a child who found his lost dog, but discovered that the dog had been hurt in a fight) and were asked to judge whether the story protagonist would feel a positive emotion (e.g., happy) as well as a negative emotion (e.g., sad). Successive questions were designed to allow the child to attribute both positive and negative emotions to the story protagonist. Although most children successfully recalled both the positive and the negative components in the stories, both age groups, especially 6-year-olds, often failed to attribute both positive and negative emotions to the story protagonist. Moreover, when children were asked if one could feel happy and sad at the same time, they often asserted the logical incompatibility of such mixed emotions (Harris, 1983).

It is unknown, however, whether the understanding of mixed emotions develops in a similar or different way in non-Western cultures. In this article, we address this question by comparing the development of mixed emotion understanding among US and Chinese children. Consistent with the findings for early aspects of emotion understanding, it is possible that an understanding of mixed emotions develops similarly across cultures, specifically when comparing US and Chinese children. However, given previous research showing differential reporting of mixed emotions by adults in Western and East Asian cultures, it is possible that children differ in their understanding of mixed emotions across cultures.

A wealth of research has shown that Western adults are inclined to view positive and negative emotions as contradictory and report few mixed emotions, whereas East Asian adults are inclined to view positive and negative emotions as less contradictory or even complementary and are prone to reporting mixed emotions (Bagozzi et al., 1999; Grossmann et al., 2016; Miyamoto et al., 2010; Sims et al., 2015; Spencer-Rodgers et al., 2010). For example, in one study (Bagozzi et al., 1999), US, Chinese, and Korean college students rated how much they felt a range of positive and negative emotions both at present and in general. The responses of US participants showed negative correlations between positive and negative emotions, whereas the responses of Chinese and Korean participants showed fewer negative and sometimes positive correlations between positive and negative emotions. Thus, US participants tended to report more predominantly positive or predominantly negative emotions, and fewer mixed emotions, as compared to Chinese and Korean participants (Bagozzi et al., 1999).

In another study (Miyamoto et al., 2010), US and Japanese college students were asked to recall a positive situation (in which they had succeeded), a negative situation (in which they had failed), and a neutral situation (in which they had transitioned into a new environment) and to describe how they felt in each situation. Although US and Japanese participants did not differ in their likelihood of reporting mixed emotions in the negative and neutral situations, Japanese participants reported more mixed emotions in the positive situation than US participants (Miyamoto et al., 2010). In addition, Sims et al. (2015) found that the cultural

differences described above generalized to community samples in China and the United States—Chinese adults reported more mixed emotions than US adults.

This cultural difference in adults' reports of mixed emotions may be related to a broader cultural difference in cognitive style, specifically reactions to contradiction. Nisbett et al. (2001) proposed that when presented with contradictory elements, adults from Western cultures are more inclined to accept one element and reject the other, whereas adults from East Asian cultures are more inclined to integrate both elements. In a study by K. Peng and Nisbett (1999, Study 3), US and Chinese college students were presented with either strong arguments supporting a position or the same strong arguments but with additional weak arguments against this position. Although US and Chinese students were equally in favor of the position when presented only with the strong supporting arguments, their reactions to the addition of weak counterarguments were different. Weak counterarguments swayed Chinese students to find a compromise (thus they became less favorable to the position) but pushed US students to be more favorable to the position (K. Peng & Nisbett, 1999). In another study, US and Chinese graduate students analyzed social conflicts (such as a conflict of values between a mother and a daughter) (K. Peng & Nisbett, 1999, Study 5). US students were more likely than Chinese students to take sides—they tended to blame one party for causing the conflict and to demand that that party change to achieve a solution. In contrast, Chinese students were more likely than US students to take the middle ground—they tended to find fault with both parties and expect both parties to change to achieve a compromise solution (K. Peng & Nisbett, 1999). Taken together, these findings suggest that US adults are more inclined to reject contradiction by endorsing one of the contradictory claims and rejecting the other, whereas East Asian adults are more inclined to accept contradiction by integrating both contradictory claims. These attitudes toward contradiction may apply to the affective domain as well and explain why US adults tend to report fewer mixed emotions as compared to East Asian adults (Bagozzi et al., 1999; Miyamoto et al., 2010; Sims et al., 2015).

Despite the wealth of cross-cultural research with adults, little is known about whether children from Western and East Asian cultures differ in similar ways to adults with respect to the acknowledgment of mixed emotions. More specifically, it is unknown whether the development of children's understanding and reporting of mixed emotions is similar or different across Western and East Asian cultures.

Current Study

This study examines the understanding and reporting of mixed emotions by 4- to 9-year-old US and Chinese children. The study design was adapted from Harris (1983) in which children listened to stories in which the protagonist encountered a situation with both a positive and a negative component. Children were first asked to report whether the story protagonist would feel positive or negative emotions and then to recall the stories; they were also invited to indicate whether they themselves could feel simultaneous mixed emotions and if so, to describe a situation in which they would do so.

Consistent with past findings on the slow development of children's recognition of mixed emotions, we predicted that children would often have difficulty in acknowledging that the story protagonist would feel both a positive and a negative emotion.

Table 1. Number of Participants in Each Age Group in the United States and China.

Age (months)	United States	China
48–59	9	16
60–71	19	20
72–83	8	26
84–95	9	28
96–119	11	8

Thus, we expected children to frequently attribute either the positive emotion or the negative emotion—but not both—to the protagonist. We also anticipated, again in line with past findings, that such limited attributions would often occur despite evidence that children could encode and recall both the positive and negative components of a given story. Finally, in light of findings with adults, we tentatively anticipated that Chinese children would be more likely than US children to acknowledge that the story protagonist would feel positive and negative emotions simultaneously and also more likely to propose situations in which they themselves would feel mixed emotions. Specifically, we anticipated that the understanding of mixed emotions would emerge earlier among Chinese children as compared with US children.

To capture this potential cross-cultural variation, we selected a broad age range (from 4 to 9 years) for this study. Previous research using similar experimental paradigms (e.g., Donaldson & Westerman, 1986) suggests that children as young as 4 years are able to answer questions about the emotions that a story character experiences based on their understanding of the story.

Method

Participants

A total of 156 children aged 4–9 years participated in the study. In the United States, 58 children were recruited from afterschool programs, preschools, and elementary schools in the greater Boston area and in China, 98 Chinese children were recruited from a preschool and elementary schools in Beijing. Table 1 shows the distribution of participants' age in each culture. Parents were invited to provide information about children's racial and ethnic background. The majority of US parents ($N=36$, 62%) provided this information and almost all Chinese parents ($N=96$, 98%) did so. The parents' reports indicated that for the subset of children whose racial and ethnic information was reported just over half of the US children were White, with a wide range of non-White children (i.e., 54% White, 19% Hispanic, 8% Asian, 5% Black, and 14% other). The Chinese children were predominantly Han Chinese (85% Han Chinese, 15% Chinese minorities). Two US children were excluded because they did not respond to any of the questions. The final sample contained 56 US children (age range=47 to 118 months; $M=77.07$ months, $SD=19.23$ months; 23 girls and 33 boys) and 98 Chinese children (age range=52 to 106 months; $M=76.49$ months, $SD=14.55$ months; 52 girls and 46 boys).

An a priori power analysis conducted with the linear multiple regression: fixed model, R^2 deviation from zero procedure in GPower 3.1 (Faul et al., 2009) using an α of .05 and a power of

.9 indicated that a sample of 130 participants was required to detect a medium effect size ($f^2=.1$). Based on the power analysis, we set a target sample size of 65 for each culture and initially distributed consent forms to 100 parents in each culture. The response rate of Chinese parents was higher than expected, resulting in a large Chinese sample size. However, the response rate of US parents was lower than expected. To make the US and Chinese samples more balanced in size, additional consent forms were distributed to recruit more US participants, but due to time constraints and the continued low response rate of US parents, the US sample remained smaller than the Chinese sample. To check whether the sample sizes were adequate to detect a small effect size, we conducted a sensitivity analysis based on the harmonic mean sample size of 71.3 from each culture. It indicated that when using an α of .05 and a power of .9, we were able to detect an effect size of .09 in the study. This study was part of a larger project, titled "Exploring Cultural Differences in the Cognitive Style of American and Chinese Children" (IRB18-1135), which was approved by the Institutional Review Board (IRB) of Harvard University on August 20, 2018.

Materials

Four stories (adapted from Harris, 1983, Study 2) were presented to each child as described below. Each story described an encounter with a situation that included both a positive and a negative component. Hence, in responding to the situation, the story protagonist was likely to experience both a positive (happy) and a negative (sad or mad) emotion. The themes of the stories were deliberately chosen so as to be familiar to children in both cultures.

Dog story: "Late one night there is a bark outside the door. It's Lassie, your dog. She has been lost all day and she has come home, but she has cut her ear in a fight."

Friend story: "Your best friend is moving to live in another city. You won't see him or her (gender matched to the participant) as often as before, but as a goodbye gift, he or she gave you his or her toy that you've always wanted."

TV story: "You can stay up late and watch TV, but the cartoon you want to see is not on TV tonight."

Housework story: "You don't have to go to school today, but your parents ask you to help them with the housework."

The interview stories and questions were written in English and subsequently translated into Chinese. The Chinese version was then independently back translated into English by translators naïve to the study hypotheses. The two English versions were compared for consistency and the Chinese translation was adjusted where appropriate.

Procedure

Each child was individually interviewed by an experimenter in a quiet room of their preschool, elementary school, or afterschool program. The experimenter introduced the task to the participant as follows:

I'm going to tell you some short stories. Listen carefully to each one because afterwards I'll ask you how you would feel if you were in the story. There are no right or wrong answers. I just want to know how you would feel. I'll also ask you to tell the story in your own words, so listen carefully.

After telling each story, the experimenter asked participants whether they would feel each of the appropriate positive and negative emotions if they were the protagonist in the story. More specifically, the experimenter asked, "If this happened to you, would you feel *happy*?" then "If this happened to you, would you feel *sad*?" for the *Dog* story. These two questions were asked in the reverse order for the *Friend* story. For the *TV* story, the experimenter asked, "If this happened to you, would you feel *happy*?" then "If this happened to you, would you feel *mad*?" These two questions were asked in the reverse order for the *Housework* story.

After the participant had responded to the two emotion questions, the experimenter asked, "Can you tell the story in your own words?" If the participant mentioned only one component of the story but did not mention the other, the experimenter provided a generic, mild prompt: "Did anything else happen in the story?" Participants were presented with the four stories in a randomized order.

After presenting all four stories, the experimenter asked a general question about the possibility of feeling mixed emotions, "Do you think you can feel both happy and sad at the same time?" Participants were asked to justify their answer, "Why do you think so?" and to give an example if they said yes, "When would you feel happy and sad at the same time?"

Results

Children's responses to the interview are reported in the following four steps: (1) the frequency with which children recalled the two components of the four stories; (2) the frequency with which children agreed to the two emotions likely to be triggered by the four stories; (3) children's replies to the open-ended questions about mixed emotions; and (4) potential links between children's responses to the stories and to the open-ended questions.

Preliminary analyses showed an effect of gender on only one outcome—children's *frequency of recall of a single component*. Specifically, boys were more likely to recall only one story component than girls when controlling for age, culture, and the interaction between age and culture ($\beta_{\text{Gender}} = .27, p < .05, R^2 = .18$). However, there were no effects of gender on any other outcomes, including children's recall of neither component or both components, children's agreement to emotions, and children's responses to the open-ended questions. Because there was no systematic gender difference, gender was not explored further in the analyses below. Preliminary analyses also showed that excluding the small number of Asian American children from the US sample did not change the results. Therefore, the analyses below included Asian American children in the US sample.

Story Recall

Children's recall of each story was coded into one of three categories: recall of neither component (if children recalled neither

the positive nor the negative component), recall of a single component (if children recalled only the positive component or only the negative component), or recall of both components (if children recalled both the positive and the negative components). Two coders, each proficient in English and Chinese, coded 23% of the data independently. Agreement was greater than 91%. Disagreements were caused by coder error (e.g., one participant recalled the *Dog* story as follows: "My dog got lost and got into a fight." One coder correctly coded this response as *recall of a single component*, because the participant only recalled the negative component of the dog getting into a fight but not the positive component of the dog returning home; however, the other coder initially coded this response as *recall of both components* because, in addition to the negative component, the participant recalled the context for the positive component—that is, the dog getting lost—but not the positive outcome, that is, the dog returning home). Differences in coding were readily resolved through discussion. One rater then coded the rest of the data. Each child received three scores, one for the *frequency of recall of neither component*, one for the *frequency of recall of a single component*, and one for the *frequency of recall of both components* (in each case, scores could range from 0 to 4). Children's mean frequency of recall of neither component, a single component, and both components is shown in Figure 1 as a function of culture.

Inspection of Figure 1 confirms that children in both cultures often recalled both components of each story, with that tendency being especially evident among Chinese children. To further examine the effects of age and culture on children's recall, three separate multiple linear regression analyses were conducted on children's frequency of recall of neither component, a single component, and both components (from 0 to 4) by age (in months), culture (United States or China), and the interaction between age and culture.

No significant interaction of age and culture was found for the *frequency of recall of neither component* or for the *frequency of recall of both components*. Therefore, the interaction was excluded from the final regression models examining these two scores. The results of the three multiple linear regressions are shown in Table 2. Both age and culture were significant main effects for the *frequency of recall of neither component* and for the *frequency of recall of both components*.

The *frequency of recall of neither component* was greater among younger children than older children and among US children than Chinese children. Conversely, the frequency of recall of both components was greater among older children than younger children and among Chinese children than US children. For the frequency of recall of a single component, there was a significant interaction between age and culture; among Chinese children, younger children were more likely than older children to recall only one emotion, whereas among US children the effect of age was not significant (results of the simple effects analyses are presented in Table S1 in the Supplementary Materials).

In summary, children often recalled both components of the stories—see Figure 1. Such comprehensive recall was more frequent among older children and Chinese children whereas recall of neither component was more frequent among younger children and US children.

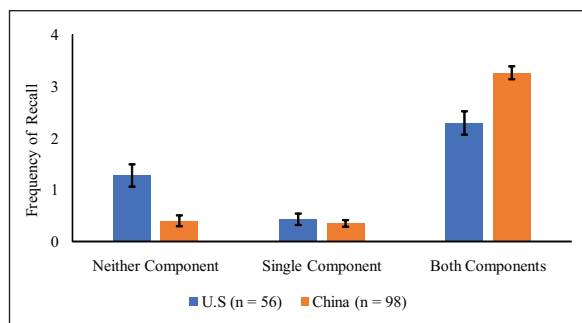


Figure 1. Mean Frequency of Recall of Neither Component, a Single Component, and Both Components by Culture. Note. Error bars indicate standard errors.

Agreement to Emotions

Children's agreement to the emotions triggered by each story was coded in a similar manner to their story recall. Thus, agreement was coded into one of three categories for each story: agreement to neither emotion (i.e., neither the positive nor the negative emotion), agreement to only one emotion (i.e., only the positive or only the negative emotion), or agreement to both emotions (i.e., both the positive and the negative emotions). Children's mean frequency of agreement to neither emotion, a single emotion, and both emotions is shown in Figure 2 as a function of culture (in each case, scores could range from 0 to 4).

Inspection of Figure 2 reveals that children in both cultures predominantly agreed to only one emotion in each story and rarely agreed to neither emotion or to both emotions. However, close inspection of Figure 2 also reveals cultural differences when children did not agree to a single emotion: Chinese children were more likely than US children to agree to neither emotion but less likely to agree to both emotions. To check these conclusions, three multiple linear regression analyses were conducted examining the frequency of agreement to neither emotion, a single emotion, and both emotions (ranging from 0 to 4) by age (in months) and culture (United States or China).

Preliminary analyses indicated that the interaction between age and culture was not significant for any of the three dependent variables. It was therefore excluded from the final models. As shown in Table 3, the *frequency of agreement to neither emotion* was greater among older children than younger children and among Chinese children than US children. By contrast, the *frequency of agreement to both emotions* was greater among US children than Chinese children. Neither age nor culture had a significant main effect on children's *frequency of agreement to a single emotion*.

In summary, children often agreed to only one of the two emotions likely to be evoked in each story. Indeed, despite the frequency with which children were able to recall both story components, as described above, the endorsement of a single emotion was children's dominant response, irrespective of age and culture. Nevertheless, when children did not respond in this way, there was an unexpected cultural difference. Agreement to neither emotion was more frequent among Chinese children than US children, whereas agreement to both emotions was more frequent among US children than Chinese children.

Table 2. Results of Multiple Linear Regression Examining Children's Frequency of Recall of Neither Component, a Single Component, and Both Components by Age and Culture.

	Neither component	Single component	Both components
β_{Constant}	1.23 (.14)*** [.94, 1.51]	.46 (.09)*** [.28, .63]	2.31 (.14)*** [2.03, 2.59]
$\beta_{\text{Age(entered)}}$	-.04 (.01)*** [-.05, -.03]	-.01 (.00) [-.02, .00]	.06 (.01)*** [.05, .07]
β_{Culture}	-.80 (.18)*** [-1.16, -.45]	-.10 (.11) [-.32, .13]	.91 (.18)*** [.56, 1.27]
$\beta_{\text{Age(entered)} \times \text{Culture}}$		-.01 (.01)* [-.03, -.00]	
F	40.19***	8.70***	68.22***
Df	2, 151	3, 150	2, 151
R ²	.35	.15	.47

Note. $n = 154$. β indicates regression coefficients. Standard errors are in parentheses. Values in brackets indicate the lower and upper limits of 95% confidence intervals, respectively. Age is mean centered. Reference category for culture is United States.

* $p < .05$. *** $p < .001$.

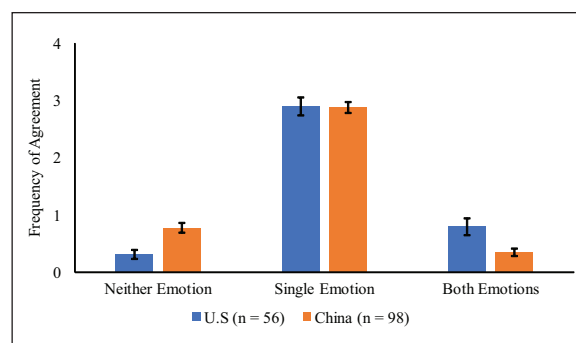


Figure 2. Mean Frequency of Agreement to Neither Emotion, a Single Emotion, or Both Emotions by Culture. Note. Error bars indicate standard errors.

This pattern of findings, especially the striking dissociation between story recall and emotion agreement, and the divergent impact of culture on these two types of responses, will be considered further in the Discussion.

Children's Responses to the General Questions

Recall that after answering questions about the four stories, children were asked an additional, open-ended general question, namely whether they could feel happy and sad at the same time. The results showed that 61.82% of US children and 58.33% of Chinese children said "yes." A logistic regression revealed that children's decision (yes or no) was not predicted by culture (United States or China) when controlling for age (in months) but was predicted by age when controlling for culture (see results in Table S2 in the Supplementary Materials): as expected, older children were more likely than younger children to say "yes" to this question ($\beta = .03, p < .05; \chi^2 = 6.78, p < .05$).

Table 3. Results of Multiple Regression Examining Children's Frequencies of Agreement to Neither Emotion, a Single Emotion, and Both Emotions by Age and Culture.

	Neither emotion	Single emotion	Both emotions
β_{Constant}	.31 (.10)** [.11, .51]	2.95 (.14)*** [2.68, 3.23]	.74 (.11)*** [.52, .96]
$\beta_{\text{Age(entered)}}$.01 (.00)* [.00, .02]	-.01 (.01) [-.02, .00]	-.00 (.00) [-.01, .01]
β_{Culture}	.46 (.13)*** [.21, .71]	-.07 (.17) [-.42, .27]	-.39 (.14)** [-.66, -.11]
F	8.91***	.63	4.07**
Df	2, 151	2, 151	2, 151
R^2	.11	.01	.05

Note. $n = 154$. β indicates regression coefficients. Standard errors are in parentheses. Values in brackets indicate the lower and upper limits of 95% confidence intervals, respectively. Age is mean centered. Reference category for culture is United States.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Children were asked to justify their answer. Their justifications were coded as falling into one of four categories: *no response*, *contradiction*, *example lacking simultaneous mixed emotions*, and *example showing simultaneous mixed emotions*. A justification was coded as a *no response* if the child offered no response or an irrelevant or unintelligible response (e.g., "I don't know." "I sleep well at home."); as a *contradiction* if the child claimed that happy and sad are contradictory to each other (e.g., "Because if you think of both of them [happy and sad], you will forget one, and only remember the other." "Because they are literally the opposite."); as an *example lacking simultaneous mixed emotions* if the child offered an example that would elicit a single (either positive or negative) emotion (e.g., "Because you bump your head." "I'm happy when I win a game.") or consecutive positive and negative emotions (e.g., "When I can play freely, I'm happy; but when I have to do homework, I'm unhappy and sad—I want to play a little more." "I'm happy and then turn sad."), but not simultaneous mixed emotions; and finally as an *example showing simultaneous mixed emotions* if the child offered an example that would elicit positive and negative emotions simultaneously. For example, a child said, "I didn't get the grades that my dad asked me to get, but he got me a toy anyway." Another child said, "Just now our math teacher posted the marks for the final test. I'm happy that I got full marks, but I'm also unhappy because I'm afraid that I would get cocky." Another child cited the *Friend* story and said, "I feel sad because my friend left, but I feel happy because he gave me my favorite toy." Two raters proficient in English and Chinese coded 22% of the data independently. High interrater reliability was achieved (Cohen's k was in the range of .88 and 1 for all codings, p values $< .001$) and differences were resolved through discussion. The two raters then divided the remaining responses and coded them separately.

Figure 3 displays the types of justifications offered by children, separated by their response to the initial question. The two bars on the left show children who had said "no" to the initial question: "Can you feel both happy and sad at the same time?" The two bars on the right show children who had said "yes" to that question. The bars show the percentages of children in each culture who offered each of the four types of responses: *no*

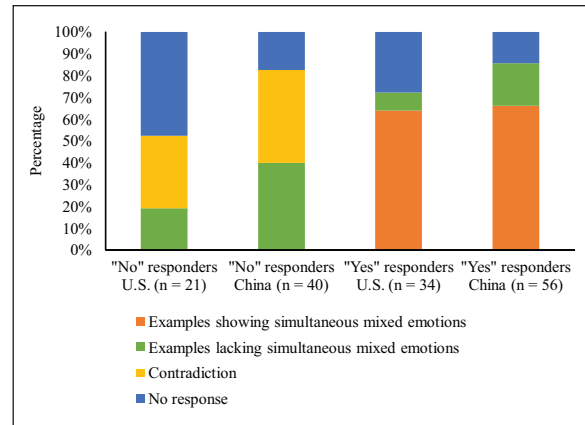


Figure 3. Percentages of Children Offering Each of Four Types of Justifications Following Their Answer to the General Emotion Question.

response, *contradiction*, *examples lacking simultaneous mixed emotions*, or *examples showing simultaneous mixed emotions*.

Inspection of Figure 3 shows that, in both cultures, children who said "no" to the question "Can you feel both happy and sad at the same time?" offered a different pattern of justifications as compared to children who said "yes" to this question. To check this conclusion, two chi-square tests, one for each culture, were conducted to examine the relation between children's decision (yes or no) and justification (no response, contradiction, examples lacking simultaneous mixed emotions, or examples showing simultaneous mixed emotions). The results confirmed that in both cultures, children who made different decisions also offered a different pattern of justifications ($\chi^2(3) = 28.91$, $p < .001$ for US children and $\chi^2(3) = 53.82$, $p < .001$ for Chinese children).

As shown in Figure 3, both US and Chinese children who had said "no" to the initial question "Can you feel both happy and sad at the same time?" tended to provide no justification, or to assert the contradiction between happy and sad emotions, or to offer an example (whether based on the interview or invented) that could only elicit a single emotion or consecutive emotions. None of the children who had said "no" offered an example of simultaneous mixed emotions.

The pattern of justification was very different among both US and Chinese children who said "yes" to the question "Can you feel both happy and sad at the same time?" The majority (around two-thirds) gave an appropriate example (whether based on the interview or invented) of simultaneous mixed emotions (e.g., "Like in the story you just told me—my friend moved away but gave me a toy." "I'm happy that I got full marks [for a test], but I'm also unhappy because I'm afraid that I would get cocky."). None of these children claimed that there is a contradiction between happy and sad emotions.

In summary, whether children denied or affirmed that simultaneous mixed emotions are possible, they often proceeded to give an appropriate justification. For both US and Chinese children, the pattern of justifications following a denial was very different from the pattern following an affirmation. In particular, denials were frequently justified by asserting that being happy and sad were contradictory, whereas affirmations were frequently justified by a pertinent example.

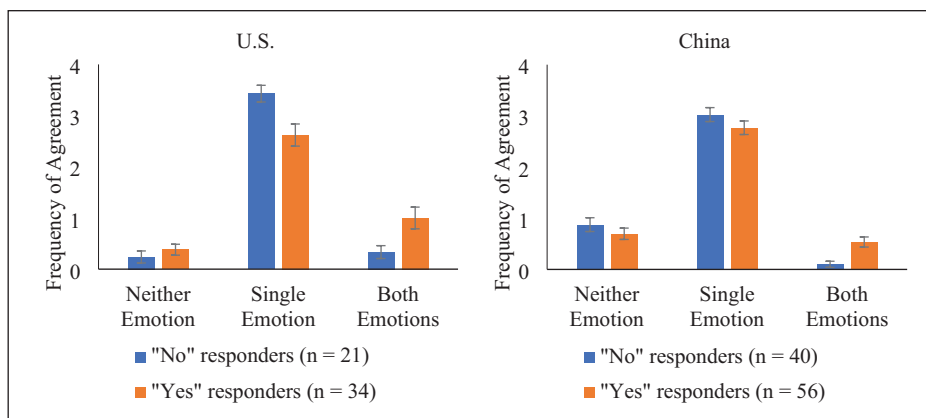


Figure 4. Mean Frequency of Agreement to Neither Emotion, a Single Emotion, or Both Emotions for “Yes” and “No” Responders to the General Question in the United States and China.

Note. Error bars indicate standard errors.

Links Between Children’s Responses to the Stories and to the Open-Ended Questions

Finally, we examined the relationship between children’s responses to the four stories and their answer to the subsequent general question. Children were separated into two groups based on whether they responded “yes” or “no” to the general question “Can you feel both happy and sad at the same time?” “Yes” and “no” responders were then compared for the frequency with which they agreed to neither emotion, to a single emotion, and to both emotions across the four stories, using independent samples *t*-tests.” The results were organized by culture (see Figure 4).

Among US children, as compared to “no” responders, “yes” responders had a significantly higher *frequency of agreement to both emotions*, $t(49.83)=2.67, p < .05$, and a significantly lower *frequency of agreement to a single emotion*, $t(53)=-2.60, p < .05$, but did not differ in the *frequency of agreement to neither emotion*, $t(53)=.85, p$ n.s.

Among Chinese children, as compared to “no” responders, “yes” responders also had a significantly higher *frequency of agreement to both emotions*, $t(86.50)=3.78, p < .001$, but did not differ in the *frequency of agreement to a single emotion*, $t(94)=-1.32, p$ n.s., or in the *frequency of agreement to neither emotion*, $t(94)=-1.03, p$ n.s.

In summary, children who answered “yes” rather than “no” to the question about whether mixed emotions are possible were also more likely to have attributed mixed emotions to the protagonist in the four preceding stories. This consistency between children’s general statement and their story attributions was found among both US and Chinese children.

Discussion

This study investigated cross-cultural similarities and differences in children’s developing understanding of mixed emotions. Four- to 9-year-old US and Chinese children listened to four stories, with each story including a positive and a negative component. Children were asked whether, if they were the protagonist, they would feel the appropriate positive emotion as well as the appropriate negative emotion, yielding three possible response patterns:

agreeing to neither emotion, to one emotion, or to both emotions. We anticipated that children would often fail to acknowledge that the story character would have mixed feelings. We also anticipated, in line with past findings, that such limited attributions would often occur despite evidence showing that children could encode and recall both the positive and negative components of the stories. Finally, in light of earlier findings with adults, we anticipated that Chinese children might be more inclined than US children to acknowledge that the protagonists would feel positive and negative emotions simultaneously.

Support for a Similar Development of Understanding of Mixed Emotions Across Cultures

The overall findings provide support for a similar pattern of thinking about mixed emotions across cultures, alongside modest support for cultural variation—albeit not in way predicted by past research with adults. Despite their ability to correctly recall both positive and negative components of the stories, children in both cultures often agreed to only one emotion and rarely agreed to both. This finding is consistent with previous research with Western children (Donaldson & Westerman, 1986; Harris, 1983; M. Peng et al., 1992). It supports the idea that recognizing the co-occurrence of mixed emotions poses a widespread challenge for children under the age of 10. A plausible interpretation of that challenge is that even when children have encoded both the negative and positive aspects of a situation, their pre-existing ideas about the compatibility of positive and negative emotions guide their appraisal of that situation. Children who think that such emotions cannot co-exist tend to appraise the emotional implications of only one of the two story components, whereas children who think that such emotions can co-exist tend to engage in a more thorough appraisal—to appraise the emotional implications of both components rather than just one. This interpretation is consistent with the link found in both cultures between children’s answer to the final general question about mixed emotions and the frequency with which they agreed to both emotions. It is also consistent with earlier research showing that younger children are more likely to acknowledge both emotions if they are first prompted by an adult to appraise the emotional implications of

each of the two story components before being asked about the possibility of mixed emotions (M. Peng et al., 1992).

Moreover, children in both cultures tended to think about and justify their ideas about mixed emotions in a similar way. At the end of the interview, children were explicitly asked whether they could feel both happy and sad at the same time. In both cultures, around 60% of children said “yes.” Among children who said “yes,” around 80% of the children in both cultures offered an example and around 80% of their examples could indeed elicit positive and negative emotions simultaneously. This suggests that when children in both cultures agreed to the idea of mixed emotions, their agreement was based on a similar conceptualization and recourse to similarly appropriate examples.

Previous research has found that children’s acknowledgment of mixed emotions increases with age (Donaldson & Westerman, 1986; Harris, 1983; Harter & Buddin, 1987). Consistent with previous research, we found that older children were more likely to say “yes” than younger children to the final general question of whether they could feel both happy and sad at the same time. However, we did not find an age effect on children’s agreement to both emotions when answering questions about the four stories. It should be noted, however, that previous research included children at and over the age of 10 and showed that children under the age of 10 often have difficulty in acknowledging mixed emotions (Donaldson & Westerman, 1986; Harris, 1983; Harter & Buddin, 1987). In comparison, the current study only included children up to the age of 9, which may explain the absence of age effect for children’s agreement to both emotions for the stories. Thus, it is plausible that older children in the current study were beginning to understand the idea of mixed emotions and could often acknowledge mixed emotions when asked explicitly (as in the final general question), but often failed to appraise the emotional implications of each story component, particularly since they were not prompted to do so (M. Peng et al., 1992).

Cultural Differences in the Integration of Mixed Emotions

Despite their frequent tendency to endorse only one emotion in both cultures, when children did *not* endorse only one emotion, there were indications of differential responding across the two cultures. Based on previous findings that Chinese adults are more likely to report mixed emotions than US adults (Bagozzi et al., 1999; Sims et al., 2015), we predicted that Chinese children would be more likely to endorse both emotions than US children. Contrary to our prediction, however, US children were more likely than Chinese children to endorse both emotions, whereas Chinese children were more likely than US children to endorse neither emotion. It is important to emphasize that this cultural difference cannot be explained by differences in story recall because Chinese children recalled both story components more often than US children and were less likely to recall neither component, precisely opposite to the pattern one might have expected if the frequency of agreement to both emotions was linked to the recall of both story components. Indeed, the divergence between the cultural pattern for recall of mixed emotions and the cultural pattern for agreement to mixed emotions reflects the more general dissociation between recall and agreement that is evident when comparing Figures 1 and 2.

This leaves unanswered the question of why, nonetheless, Chinese children endorsed both emotions less often than US

children and conversely endorsed neither emotion more often than US children. One explanation is that US children had a better understanding of mixed emotions as compared to their Chinese peers. This explanation is consistent with previous findings that European American preschoolers have a better understanding of what situations provoke particular emotions as compared to their Chinese (Wang, 2003) and Chinese American peers (Doan & Wang, 2010). This explanation is also consistent with previous findings that European American mothers talk more about emotions with their preschoolers as compared to Chinese American mothers (Doan & Wang, 2010) and that maternal talk about emotions facilitates children’s emotion understanding (Harris et al., 2005). However, the cultural difference reported here is unlikely to be due to differences between US and Chinese children in their situational EU, because, as indicated by their responses to the final general questions, US and Chinese children were likely to deny or acknowledge mixed emotions with a similar frequency and provided a similarly differentiated pattern of justifications for either their denial or their acknowledgment.

A more plausible explanation of the cultural difference in the balance of agreement to both emotions as compared to neither emotion is that an understanding of mixed emotions can be expressed in two different ways—via an agreement to both emotions or, alternatively, a denial of both emotions. Arguably, in conceptualizing mixed emotions, one could take a *co-existence* approach and view both emotions as being experienced simultaneously; alternatively, one could take a *neutralization* approach and view the two emotions as canceling each other out, resulting in neutral or less intense emotions. The *co-existence* approach is consistent with the operationalization of the understanding of mixed emotions in previous research with Western children (Harris, 1983; Harter & Buddin, 1987; M. Peng et al., 1992); even the term “mixed emotions” suggests coexisting instead of neutralized emotions. Nevertheless, support for the *neutralization* approach was sometimes apparent in children’s spontaneous justification for their responses to the stories in this study. Some children explained that the negative component in the story reduced the positive emotion instead of producing a negative emotion, and vice versa. For example, when asked whether she would feel sad in the *Friend* story, a Chinese child replied, “I wouldn’t feel sad; I just wouldn’t be happy.” In another example, a Chinese child explained for the *Dog* story that, “I wouldn’t feel happy because my dog broke her ear; I wouldn’t feel sad because she is home.” In addition, older children in both cultures agreed to neither emotion more often than younger children. Given the developmental trend toward increased understanding of mixed emotions, children’s agreement to neither emotion may sometimes be part of this understanding. The age effect on agreement to neither emotion suggests that the *neutralization* approach might sometimes be present among some US children as well, albeit not as prevalent as among Chinese children.

Hence, it is possible that, when considering mixed emotions, US children are more inclined to take the *co-existence* approach and Chinese children are more inclined to take the *neutralization* approach. Note that previous research on Western children’s understanding of mixed emotions (e.g., Harris, 1983; Harter & Buddin, 1987; M. Peng et al., 1992) did not report children who agreed to neither emotion. This suggests that the proportion of Western children who agreed to neither emotion might be negligible and that this response pattern might be relatively unique to East Asian children. This would explain why previous research

with Western children has almost exclusively focused on the *co-existence* approach while overlooking the *neutralization* approach, with the notable exception of Donaldson and Westerman (1986).

Donaldson and Westerman (1986) proposed that children's understanding of mixed emotions develops in four consecutive stages: in the first stage, children deny the possibility of feeling multiple emotions; in the second stage, children acknowledge the possibility of feeling multiple emotions consecutively (e.g., first sad and then happy), but not simultaneously; in the third stage, children acknowledge the possibility of feeling multiple emotions simultaneously (i.e., mixed emotions), but consider these emotions somewhat separate from each other without fully recognizing that they may interact with one another (e.g., one child in their study said that "some part of her body is happy and some part is sad," p. 658); and in the fourth and final stage, children acknowledge not only the co-existence of, but also the potential interaction between, multiple emotions—for example, that positive emotions may dampen negative emotions and vice versa. In their study with 4- to 5-, 7- to 8-, and 10- to 11-year-old US children, they found that almost no children in the two younger groups showed an understanding consistent with the final stage, whereas the majority of the children in the oldest group did so (Donaldson & Westerman, 1986). This developmental trajectory is consistent with the current finding that, overall, older children were more likely than younger children to agree to neither emotion.

However, Donaldson and Westerman (1986) included "feeling confused" about the mixed emotions as an indicator of understanding the interaction between emotions in the final stage. For example, among those categorized as being in the final stage, one child said that the story protagonist's feelings are "mixed up" and another child described the story protagonist's feelings toward his dog as "he won't know whether he loves or hates his dog" (Donaldson & Westerman, 1986, p. 658). Arguably, being confused about mixed emotions is distinct from feeling less-intense emotions, or feeling neither emotion due to neutralization, as in this study. Because Donaldson and Westerman (1986) did not specify how many children in the fourth stage expressed neutralized emotions as opposed to confusion, they did not highlight the distinction between the *co-existence* and the *neutralization* approaches as proposed here.

Limitations and Future Directions

One limitation of this study is that the US sample was smaller than the Chinese sample. This was due to a lower response rate in the recruiting process in the US as compared to China—where it was close to 100%. A plausible explanation for the different response rates in the United States and in China is that parents in the two cultures responded to teachers' requests differently. It is possible that Chinese parents were more likely than US parents to view the teacher as an authority and to defer to the teacher's request. Hence, it is important to caution that the smaller US sample might be biased toward parents interested in participating in research. It would be desirable to replicate the findings with more balanced samples from the United States and China.

A further limitation of the study is the absence of a measure of children's language ability as a covariate for EU. Previous research has shown that children's EU is correlated with language ability, such as receptive vocabulary (Cutting & Dunn, 1999) and

receptive grammar knowledge (Pons et al., 2003). In future research, it would be informative to examine whether the effects of age and culture reported in this study hold when controlling for children's language ability.

Another limitation of the study is that no visual aid was used to accompany the verbal presentation of the stories. Previous research examining children's emotion understanding has used images to depict (Pons et al., 2004) or puppets to enact vignettes (Denham, 1986). Not providing visual aids might have increased the difficulty of processing and remembering the stories, thereby making the task more challenging, especially for younger children. In future research, it would be desirable to show children images when telling them stories to help them process the information presented verbally.

Finally, it is appropriate to acknowledge that the unexpected cultural differences with respect to children's agreement to neither emotion or both emotions were infrequent when compared with children's agreement to a single emotion—which was the most frequent response in both cultures. Moreover, the proposed interpretation of this cultural difference is speculative. Further research is needed to establish that the difference is robust and to probe children's conceptualization of mixed emotions in more detail. For example, it would be informative to ask children who agree to both emotions or to neither emotion why they so agree. Children's justifications of their answers should throw more light on the relative frequency of the co-existence as compared to the neutralization approach to mixed emotions.


In conclusion, the findings of this study show that in important respects children's understanding of mixed emotions develops in a similar way in the United States and China. This study, along with previous research (Harris & Cheng, 2022; Molina et al., 2014; Pons et al., 2004; Tang et al., 2018), provides further support for a similar development of emotion understanding. In particular, the findings show a notable dissociation between recall and agreement. Whereas children in both cultures could often recall both emotionally charged components of a story, they frequently claimed that the protagonist would only feel one of the two emotions. Nevertheless, in both cultures, older children were more likely than younger cultures to affirm the possibility of feeling happy and sad at the same time, and children in both cultures offered appropriate justifications for their claim. In addition, although the findings did not reveal dramatic cultural differences, they did suggest alternative, hitherto less conspicuous sources of cultural variation. US and Chinese children did not differ in terms of whether or not they understood mixed emotions, but they tended to take intriguingly different approaches to the integration of these emotions—approaches that might be linked to cultural variation in the tendency to think of emotions as either coexisting or susceptible to neutralization.

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Supplemental Material

Supplemental material for this article is available online.

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