

# Context Sensitivity in Canadian and Japanese Children's Judgments of Emotion

Keiko Ishii<sup>1</sup> · Nicholas O. Rule<sup>2</sup> · Rie Toriyama<sup>3</sup>

Published online: 20 April 2016  
© Springer Science+Business Media New York 2016

**Abstract** Previous studies showed that East Asians are more sensitive than North Americans to contextual information, and that the cultural differences in context sensitivity emerge in preschool children. Yet, little is known about whether this generalizes to children's emotional judgments. The present study tested Canadian and Japanese preschool children and examined cross-culturally the extent to which facial expressions of surrounding people influence judgments of a target person's emotion. Japanese children were more likely than Canadian children to judge an emotionally-neutral target as more negative (positive) when the background emotion was negative (positive), demonstrating an assimilation effect. Canadian children, however, showed a contrast effect: judging the target person's neutral emotion as more negative when the background emotion was positive. These data extend extant understanding of emotion recognition by illuminating nuances in perceptual processes across developmental and cultural lines.

**Keywords** Culture · Context sensitivity · Child · Emotion · Socialization

There is growing consensus in the psychological literature that the manner of understanding information and thinking about

the world varies across cultures. Nisbett et al. (2001) proposed that an analytic mode of thought is dominant in Western cultures whereas a holistic mode is dominant in Eastern cultures. The analytic mode is characterized by a tendency to attend to focal objects and central elements in a perceptual field and to formulate relationships among them linearly and logically. The holistic mode, on the other hand, is characterized by a tendency to attend to the whole field, including both focal objects and central elements, and to formulate relationships nonlinearly and dialectically. The expected cultural variations in mode of thought have been supported by empirical findings regarding causal attribution (e.g., Morris and Peng 1994), attention (e.g., Masuda and Nisbett 2001), reasoning (e.g., Ji et al. 2001), categorization (Norenzayan et al. 2002), and comprehension of utterances (Ishii et al. 2003; see Ishii 2013, for a recent review of the literature). Moreover, some emerging studies have indicated the influence of culture on the neural mechanisms underlying cognitive processes (see Rule et al. 2013, for a recent review of the literature). For example, Hedden et al. (2008) found larger activation in the frontal and parietal areas, which are related to attentional control, for culturally non-preferred tasks (i.e., cognitive tasks which require the analytic mode to solve for East Asians and tasks which require the holistic mode to solve for Americans) than for culturally preferred tasks (i.e., cognitive tasks which require the analytic mode to solve for Americans and tasks which require the holistic mode to solve for East Asians).

Culturally specific patterns of attention have been found even in judgments of people's emotions from their facial expressions. Masuda et al. (2008) asked Japanese students in a Japanese university and American students in an American university to rate a central person with a facial expression (e.g., happy) who was surrounded by other people showing the same (e.g., happy) or a different (e.g., angry) facial

---

✉ Keiko Ishii  
ishii@lit.kobe-u.ac.jp

<sup>1</sup> Faculty of Letters, Kobe University, 1-1 Rokkodai-cho, Nada-ku, Kobe 657-8501, Japan

<sup>2</sup> University of Toronto, Toronto, ON, Canada

<sup>3</sup> University of Tokyo, Tokyo, Japan

expression. The participants were presented with two different central persons (a Caucasian boy and an Asian boy) to avoid an ingroup advantage in recognizing emotional expressions (e.g., Elfenbein and Ambady 2002). The researchers found that regardless of the central person's ethnicity, the Japanese were more influenced by the surrounding people's emotions than the Americans when rating the central person's emotion. This suggests that people's implicit beliefs about others' emotional expressions differ cross-culturally. Reflecting culturally divergent views of the self (Markus and Kitayama 1991), North Americans are likely to think that people's emotional expressions manifest in their internal reaction, whereas East Asians—including Japanese—are likely to think that other people's emotional expressions are constituted by interpersonal relationships in addition to internal reactions.

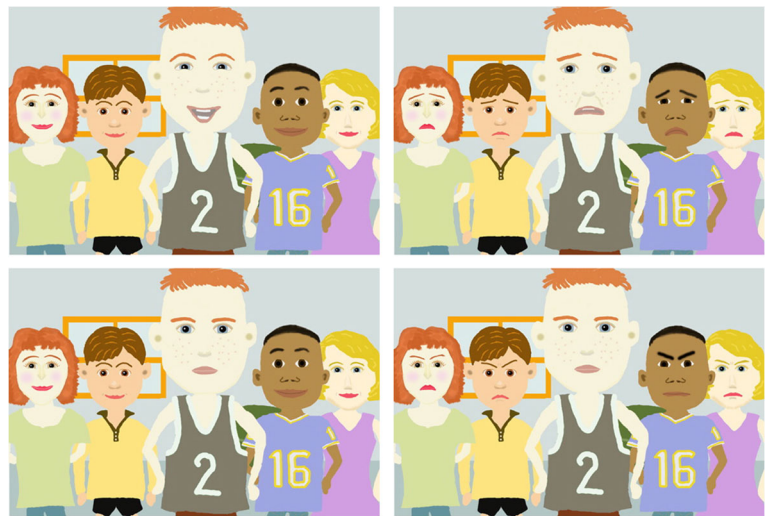
It has been assumed that culturally specific patterns of attention are embedded in and reinforced by culturally divergent practices and routines of daily life, and that children acquire such patterns through socialization (e.g., Ishii et al. 2014; Senzaki et al. 2016). However, little is known about cultural differences in cognitive styles among children. In one exception, Ji (2008) examined when cultural differences in predictions (Ji et al. 2001), which indicate that Chinese are more likely than Americans to believe that events are constantly changing, start to emerge. She tested Chinese and Canadian children and demonstrated that the cultural differences were present to some extent in children aged 9 and became significant in children aged 11. In another exception, Duffy et al. (2009) tested American and Japanese children in a modified version of the framed line task (Kitayama et al. 2003). In the framed line task, participants are presented with a square frame in which a vertical line is printed and then presented with another square frame of a different size. In an absolute judgment condition, participants are asked to draw a line that is identical in absolute length to the first line. In contrast, in a relative judgment condition, they are asked to draw a line that is proportionally the same as the first line. Kitayama et al. (2003) showed that Americans were more accurate in the absolute than in the relative judgment, reflecting the analytic mode of attention, whereas Japanese were more accurate in the relative than in the absolute judgment, reflecting the holistic mode of attention. Consistent with this finding, Duffy et al. found that American children aged 6 and older were more accurate in the absolute than the relative judgment, whereas Japanese children aged 6 and older were more accurate in the relative than the absolute judgment. However, children aged 6 or younger were more accurate in the relative than the absolute judgment regardless of culture. More recently, Imada et al. (2013) used a different set of cognitive tasks to demonstrate that cultural differences in context

sensitivity emerge by 6–7 years (e.g., free description of scenes that include focal and background objects) and that context sensitivity increases as a function of performance in an executive function task on set-shifting, which was greater in Japanese children than in American children.

In contrast, Kuwabara et al. (2011) suggested that culturally specific patterns of attention emerge among children who are younger than 6 years old. In the study, Japanese and American children aged 40–60 months were presented with a relationship between a facial expression of a target person and a related object (e.g., a smiling face and a cake) and asked to select the appropriate expression for the target person when the object was changed to a neutral one (e.g., a chair). They found that American children were more likely than Japanese children to select the same facial expression as the one presented initially, suggesting that Japanese children were more sensitive to changes in context. The authors also mentioned a possibility that reflecting the significance of emotional displays and appraisals in daily life, the emergence of cultural differences in attentional styles would take socio-emotional judgments as a starting point. As another finding on culturally specific patterns of attention emerging among children who are younger than 6 years old, Kuwabara and Smith (2012) reported that Japanese 4-year-old children performed better than their American counterparts in a relational matching task. The finding was consistent with a previous study conducted by Richland et al. (2010) in which Chinese 4-year-old children outperformed their American counterparts in a similar task that included relationally complex problems. However, further investigation in additional social contexts is needed to corroborate the results.

In the present research, we tested Canadian and Japanese preschool children aged 4–6 years—the ages around the threshold at which context sensitivity appears to emerge (e.g., Duffy et al. 2009; Imada et al. 2013; Kuwabara et al. 2011)—to examine the extent to which social context influences emotion recognition. To do this, we applied the emotion perception task developed by Masuda et al. (2008) in which facial expressions of people surrounding a target influence the judgment of that central person's emotional expression in different cultures. In Masuda et al. (2008), adults were presented with stimuli consisting of a central person expressing an emotion who was surrounded by other people with congruent or incongruent expressions and were asked to rate the magnitude of the central person's emotion using 10-point scales for anger, sadness, and joy. Because young children may have difficulty understanding semantic descriptions of emotional expressions, we adapted the task by asking them to rate the central emotion by selecting one of 5 schematic faces ranging from negative (sad) to positive (happy). We hypothesized that if children acquire culturally specific

**Fig. 1** Examples of stimuli used in the current study. These stimuli were originally developed by Masuda et al. (2008). Top: congruent stimuli. Bottom: incongruent stimuli



attentional modes by age 6 (e.g., Duffy et al. 2009; Kuwabara et al. 2011), then Japanese children would be more influenced by the background people’s emotions than the Canadian children.

**Method**

**Participants**

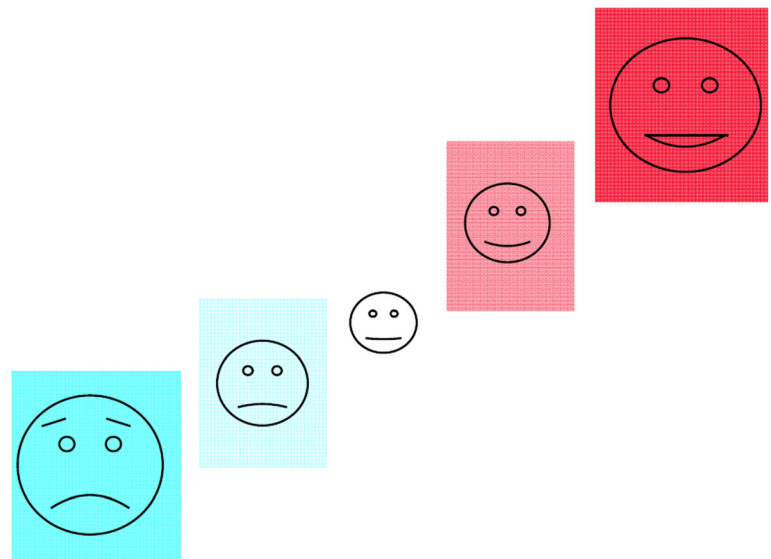
Twenty-five Japanese preschool children (12 girls and 13 boys, 46–75 months old) and 18 Canadian preschool children (11 girls and 7 boys, 48–73 months old) participated in the study. There was no difference in the

children’s ages across the two groups [Japanese:  $M (SD) = 63.00 (7.98)$  months, Canadians:  $M (SD) = 59.56 (6.84)$  months,  $t(41) = 1.48, p = .15, d = .46$ ]. Japanese children were recruited in Kyoto and Tokyo, whereas Canadian children were recruited in Toronto. Parental consent was obtained before data collection. The children, who gave verbal assent to participate in the study, were tested individually.

**Materials**

Twelve stimuli of a Caucasian central person were selected from the original set developed by Masuda et al. (2008). The selected stimuli consisted of a 3 (central person’s emotion: intense

**Fig. 2** Schematic faces used as a scale for judging the central person’s emotion



**Table 1** Mean ratings for the central person's emotions in Canadian and Japanese children (1 = negative, 5 = positive)

	Background Emotion															
	Canadian Children								Japanese Children							
	Angry		Sad		Happy		Neutral		Angry		Sad		Happy		Neutral	
Central Emotion	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sad	1.17	.38	1.28	.46	1.33	.59	1.22	.55	1.28	.68	1.16	.37	1.36	.86	1.24	.44
Happy	4.89	.32	5.00	.00	4.94	.24	4.83	.51	4.88	.33	4.84	.37	4.88	.33	4.84	.37
Neutral	2.83	.79	2.94	.42	2.61	.85	3.00	.49	2.60	.82	2.88	.73	3.00	.76	2.96	.61

sadness, intense happiness, and neutral)  $\times$  4 (background emotion: angry, sad, happy, and neutral) design. Although Masuda et al. (2008) developed stimuli for both Caucasian and Japanese central targets and confirmed that the central targets' expressions were perceived in the same manner cross-culturally in the pilot test, they found in the two studies conducted that the Caucasian target's happy and anger expressions were judged as stronger than those of the Japanese target and that the effects of the background facial emotions in the judgment of the central person's emotion did not depend on the central person's ethnicity. Thus, we decided to use only the Caucasian stimuli whose expressions were clearer so that children could judge the central person's emotion more easily. Moreover, in Masuda et al. (2008), cultural differences in the effects of the background facial emotions on the judgment of the central person's emotion were relatively smaller when the central person's emotion was anger than when it was either happiness or sadness. We thus decided not to include the emotion of anger for the central person so that children would not become bored with repeated trials. The central and background emotions were congruent in half of the stimuli and incongruent in the other half (Fig. 1). Each stimulus was printed in color on a sheet of A4 size paper. The size of each stimulus was 22.7 cm  $\times$  15.2 cm.

### Procedure

The children were first given two practice trials with cartoons illustrating only a central person whose face expressed either happiness or sadness. After the experimenter confirmed that they understood the task, they proceeded to the experimental trials; no child failed the practice. Children were then presented with a set of 12 cartoons illustrating a central person with one of three different expressions (happiness, sadness, and neutral) surrounded by other people with happy, sad, angry, or neutral faces (see the Materials section for details). For each of the cartoons, the children were asked to judge the target person's emotion by choosing one of 5 schematic faces ranging from negative to positive expressions (Fig. 2). Each cartoon was presented until the children had finished judging it. The order of the experimental trials was randomized for each participant. We coded the children's choices of the schematic faces so that

smaller numbers indicated more negative expressions (1 = negative, 3 = neutral, 5 = positive).

## Results

### Influences of Background Emotions on the Judgment of Central Emotions

For each of the 3 central emotions (sad, happy, and neutral), a 2 (culture)  $\times$  2 (gender)  $\times$  4 (background emotion) mixed model ANOVA with repeated measures on the last factor was conducted on the mean rating computed across participants (see Table 1 for descriptive statistics). The results of the ANOVAs are summarized in Table 2. No significant effect was found when the central person's emotion was either happy or sad, except for an interaction between culture and gender in the judgment of the central person's happy expression.<sup>1</sup> Overall, participants could judge these emotions accurately with little influence of background emotions. Judgments of the central person's neutral expression, on the other hand, showed a significant interaction between the child's culture and the background emotion of the stimuli,  $F(3, 117) = 2.80$ ,  $p = .04$ ,  $\eta_p^2 = .07$ . This suggests a difference between Japanese and Canadian children's processing of emotion when central and background characters display congruent versus incongruent emotional expressions.

To examine this difference more closely, we conducted a 2 (culture)  $\times$  2 (gender)  $\times$  3 (incongruent background: angry, sad, and happy) mixed-model ANOVA with repeated measures on the last factor for the judgment of the central person's neutral emotion on the differences between the ratings given when the central person's emotion was congruent (i.e., all neutral) versus incongruent with the background emotion.

<sup>1</sup> Canadian boys ( $M = 4.79$ ,  $SD = 0.50$ ) rated the central person's happy expression lower than Canadian girls ( $M = 5.00$ ,  $SD = 0$ ),  $t(39) = 2.25$ ,  $p = .03$ ,  $d = .72$ , whereas there was no gender difference in Japanese participants (boy:  $M = 4.90$ ,  $SD = 0.30$ , girl:  $M = 4.81$ ,  $SD = 0.39$ ,  $t(39) = 1.17$ ,  $p = .25$ ,  $d = .37$ ). The interaction effect appeared independently of the background emotion and thus it is beyond the scope of the present research.

**Table 2** *F* and *p* values from ANOVAs conducted on the mean ratings of central emotions

Variable	Central Emotion					
	Sad		Happy		Neutral	
	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
Culture	0.00	1.00	0.32	0.58	0.02	0.88
Gender	0.01	0.91	0.99	0.33	1.17	0.29
Culture × Gender	1.42	0.24	6.12	0.02	1.01	0.32
Background Emotion (BE)	0.40	0.75	0.90	0.45	1.52	0.21
BE × Culture	0.44	0.73	0.94	0.42	2.80	0.04
BE × Gender	0.34	0.80	1.56	0.20	1.91	0.13
BE × Culture × Gender	1.51	0.22	0.39	0.76	1.35	0.26

The mean size of the discrepancy was therefore negative (positive) when the central person's face was judged as more negative (positive). Table 3 shows the pertinent means. The result of the ANOVA is presented in Table 4. Again, there was a significant interaction between culture and background emotion,  $F(2, 78) = 3.14$ ,  $p = .05$ ,  $\eta_p^2 = .07$  (see Fig. 3). Once again, there was no effect of gender.

In Japanese children's judgments, the mean difference was reliably negative when the background emotions were angry [ $M = -0.36$ ,  $SD = 0.82$ ;  $t(78) = 2.63$ ,  $p = .01$ ,  $d = .60$ ] and in the same direction, but not significant, for sad [ $M = -0.08$ ,  $SD = 0.76$ ,  $t(78) = 0.58$ ,  $p = .56$ ,  $d = .13$ ]. In contrast, the mean difference was positive, but not significant, when the background emotion was happy:  $M = 0.04$ ,  $SD = 0.76$ ,  $t(78) = 0.29$ ,  $p = .77$ ,  $d = .07$ . Although the effect of background emotion was significant only for anger, Japanese children's judgments of the central person's neutral emotion appear to have been influenced by the peripheral targets' background emotions, indicating an assimilation effect. Correlations between the effect of each of the background emotions and the children's ages were not significant ( $r = .16$  for angry,  $r = .18$  for happy, and  $r = -.24$  for sad,  $ps > .20$ ).

In contrast, this assimilation effect was weak among Canadian children. It is worth noting that the weak assimilation effect among Canadian children did not result from a lack of attention to the background emotions. In Canadian children's judgments, angry and sad background emotions had little influence on the perception of the central person's neutral expression:  $M_{\text{Difference}} = -0.17$ ,  $SD = 0.79$ ,  $t(78) = 1.04$ ,  $p = .30$ ,  $d = .24$ , for angry;  $M_{\text{Difference}} = -0.06$ ,  $SD = 0.42$ ,  $t(78) = 0.35$ ,  $p = .73$ ,  $d = .08$ , for sad. However, Canadian children showed a contrast effect when the background emotion was happy. Thus, they judged the central person's neutral emotion as significantly more negative when the background emotion was happy than when it was neutral:  $M_{\text{Difference}} = -0.39$ ,  $SD = 0.85$ ,  $t(78) = 2.41$ ,  $p = .02$ ,  $d = .55$ . Correlations between the effect of each of the background

emotions and the children's ages were not significant ( $r = -.22$  for angry,  $r = .21$  for happy, and  $r = -.28$  for sad,  $ps > .20$ ), although the correlations imply that the effect of background emotion becomes larger as Canadian children get older.<sup>2</sup>

Indeed, a 2 (culture) × 2 (gender) between-subjects ANOVA performed on the mean size of the assimilation effect collapsed across target's expression showed marginally significant main effects of culture and gender. Japanese children ( $M = 0.16$ ,  $SD = 0.56$ ) showed a marginally larger assimilation effect than Canadian children ( $M = -0.06$ ,  $SD = 0.40$ ),  $F(1, 39) = 3.04$ ,  $p = .09$ ,  $r = .27$ . Regardless of culture, girls ( $M = 0.17$ ,  $SD = 0.58$ ) showed a marginally larger assimilation effect than boys ( $M = -0.04$ ,  $SD = 0.39$ ),  $F(1, 39) = 3.18$ ,  $p = .08$ ,  $r = .27$ . No interaction effect between culture and gender was found.

### Stimulus Verification

As reported above, the influence of background emotions appeared only in the judgment of the central person's neutral emotion. To examine whether it is specific to children or results from a methodological constraint (i.e., using a bipolar scale that has labels of schematic faces ranging from negative to positive), we collected additional data from 40 Japanese and 29 Canadian undergraduate students by using the same set of stimuli and asking them to rate the magnitude of the central person's emotion using a 11-point bipolar scale (1: very sad, 6: neutral, 11: very happy). As in the case with children, Japanese undergraduate students ( $M = 0.38$ ,  $SD = 0.62$ ) showed a larger assimilation effect caused by the background emotions than their Canadian counterparts ( $M = 0.12$ ,  $SD = 0.24$ ) in the judgment of the central person's neutral emotion,  $F(1, 67) = 4.89$ ,  $p = .03$ ,  $r = .26$ . However, no cultural difference on the effect was found either in the judgment of the central person's happy emotion ( $F(1, 67) = 0.82$ ,  $p = .39$ ,  $r = .11$ ) or sad emotion ( $F(1, 67) = 2.50$ ,  $p = .12$ ,  $r = .19$ ). This implies that the current study's methodological constraint might cover cultural differences in the sensitivity to social contexts.

<sup>2</sup> We divided children into younger (10 Canadians and 11 Japanese) and older groups (8 Canadians and 14 Japanese) at 60 months for each culture and performed a 2 (culture) × 2 (age) × 4 (background emotion) mixed model ANOVA for the judgment of each of the central person's emotions on the differences between the ratings given when the central person's emotion was congruent versus incongruent with the background emotion. In the judgment of the central person's sad emotion, an interaction between age and background emotion was marginally significant,  $F(2, 78) = 2.73$ ,  $p = .07$ ,  $\eta_p^2 = .07$ . The older group ( $M = 0.34$ ,  $SD = 0.97$ ) judged the central person's sad emotion as more positive when the background emotion was happy, compared to the younger group ( $M = -0.07$ ,  $SD = 0.35$ ),  $t(78) = 2.22$ ,  $p = .03$ ,  $d = .50$ . Except for this, no significant interaction including age was found.

**Table 3** The mean size of the discrepancy for the judgment of the central person's neutral emotion in Canadian and Japanese children, which was computed by subtracting the ratings given when the central person's

emotion was incongruent with the background emotion from those given when it was congruent (i.e., all neutral)

	Background Emotion											
	Canadian Children						Japanese Children					
	Angry		Sad		Happy		Angry		Sad		Happy	
Children's gender	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Boy	.29	.49	.14	.38	-.57	.79	-.42	.66	.04	.41	-.04	.64
Girl	-.46	.82	-.18	.41	-.27	.91	-.29	.99	-.21	.97	.12	.90

The size of the discrepancy was negative (positive) when the central person's face was judged as more negative (positive)

## Discussion

We tested Canadian and Japanese preschool children aged 4–6 years and examined cultural differences in their sensitivity to social contexts by using an emotion perception task. Japanese children tended to judge the central person's neutral emotion as more negative (or positive) when the background emotion was negative (or positive). Such an assimilation effect was somewhat larger in Japanese children than in Canadian children. The assimilation effect in Japanese children was particularly obvious when the background was angry. Although the cultural difference in the assimilation effect was marginally significant, it provides some support for previous findings on cultural differences in context sensitivity in emotion perception (e.g., Masuda et al. 2008). It also provides evidence to corroborate previous findings that cultural differences in context sensitivity begin to emerge before and around age 6 (Kuwabara et al. 2011) by examining the cultural differences in additional social contexts.

The current finding suggests that Japanese children may be particularly sensitive to others' anger. One possible explanation for this pattern is that Japanese children's reactions to anger might be more extreme compared to the other emotions because they may only rarely be exposed to anger expressions

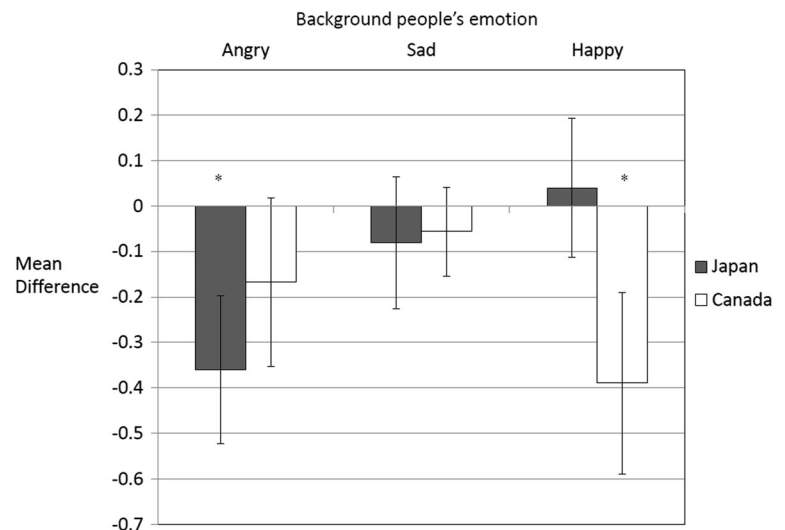
in daily interactions (particularly with mothers), reflecting the Japanese cultural norm to avoid conflict and maintain harmony (Miyake et al. 1986). Alternatively, Japanese children might have used a display rule in their perceptions of the central character with a neutral expression. This might have led them to think that although the person is really feeling angry, he/she would avoid showing an angry expression so as not to violate the Japanese social norm against expressing anger. These possibilities would benefit from additional exploration in future research. For instance, a pilot study interviewing children in their judgment for emotional expressions would be useful for such exploration.

Another interesting finding is that the weak assimilation effect among Canadian children did not result from their lack of attention to context. When the background emotions were angry and sad, Canadian children were relatively unaffected by them in their judgment of the central person's neutral expression. In contrast, when the background emotion was happy, Canadian children judged the central person's neutral emotion as significantly more negative compared to when it was neutral. This suggests that Canadian children were not insensitive to the background emotion but rather that their sensitivity may be specific to happiness. Whereas Japanese children might apply a display rule based on emotion suppression in their attention to the angry background emotion, Canadian children might engage in a similar process for the happy background emotion. The contrast effect among Canadian children may relate to the individualist cultural norm of expressing one's feelings independently of the feelings of others (Matsumoto et al. 2008). Canadian children might have already learned this cultural norm and inferred from it that the central person with a neutral expression is really expressing a negative emotion. Moreover, given previous findings showing that contrast effects are elicited by social comparison (e.g., Herr et al. 1983), and because the independent view of the self assumes that individuals are distinctly separate from each other (Markus and Kitayama 1991), Canadian children might be likely to

**Table 4** *F* and *p* values from an ANOVA conducted on the mean size of the discrepancy for the judgment of the central person's neutral emotion

	<i>F</i>	<i>p</i>
Culture	0.08	0.78
Gender	0.62	0.43
Culture x Gender	0.76	0.39
Background Emotion (BE)	0.70	0.50
BE x Culture	3.14	0.05
BE x Gender	2.00	0.14
BE x Culture x Gender	1.53	0.22

**Fig. 3** Japanese and Canadian children's mean ratings of the central target's emotional expression when congruent (i.e., all neutral) versus incongruent with the emotion displayed by the background targets. \*  $p < .05$



compare the central person with the surrounding people, thereby promoting such a contrast effect.

Moreover, the assimilation effect was somewhat larger in girls than in boys regardless of culture. The literature suggests greater accuracy in the recognition of facial expressions in females than in males over the course of development. The female advantage in the recognition of facial expressions appears even in the earliest years of development and is sustained through the socialization process (McClure 2000 for a review). The gender difference in the readiness and interest in the recognition of facial expressions might be reflected in greater sensitivity to background emotions among girls than boys. However, the gender effect was marginally significant and was negligible in the judgment of specific emotions. This warrants further investigation of the gender difference by testing with a large group of participants.

Although the current results provide interesting implications for an association between cultural norms and emotional perception in children, there are several limitations that should be considered in future research. For example, might cultural differences in context sensitivity increase with age? Furthermore, when do such differences reach a logarithmic plateau? Although the present research could not address these questions sufficiently due to a small number of participants across cultures, such an examination may also enable tests of potential gender differences in emotion perception, including age-based divergence between men and women at some point in the lifespan. It is also unclear whether individual differences in other domains of cognitive development might mediate cultural differences in context sensitivity for emotion recognition. Given Imada et al.'s (2013) findings of cultural differences in children's context sensitivity for an array of cognitive tasks, it is possible that the cultural differences observed in emotion perception in this study may be mediated by

executive function. As a related cognitive development, theory of mind, which enables individuals to understand that other people have their own mental processes and emerges around 4 years of age, might also be associated with the difference in context sensitivity. Additionally, revising the way of rating and using a more objective measurement (e.g., eye tracking) may be useful for future research because such approaches may be more sensitive to cultural differences in context sensitivity than those used in the current study.

In conclusion, although past studies have shown that East Asians are more sensitive than North Americans to contextual information, little is known about the development of culturally specific patterns of attention and perception. The current results contribute to the literature by showing cultural differences in sensitivity to social context among preschool children. We believe that understanding of the development of cultural differences in attention and perception would be enhanced by a systematic series of cross-cultural studies targeting a larger sample of children using more refined measurements. The current study is a small step in this direction.

**Acknowledgments** The research was supported by Grant-in-Aid for Scientific Research 19730381 from the Ministry of Education, Culture, Sports, Science and Technology of Japan. We thank Mana Izutsu, Natsuko Miwa and Yu Niiya for their support in carrying out this work.

**Compliance with Ethical Standards** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

**Conflict of Interest** Keiko Ishii declares that she has no conflict of interest. Nicholas Rule declares that he has no conflict of interest. Rie Toriyama declares that she has no conflict of interest.

## References

- Duffy, S., Toriyama, R., Itakura, S., & Kitayama, S. (2009). Development of cultural strategies of attention in north American and Japanese children. *Journal of Experimental Child Psychology*, *102*, 351–359. doi:10.1016/j.jecp.2008.06.006.
- Elfenbein, H. A., & Ambady, N. (2002). On the universality and cultural specificity of emotion recognition: a meta-analysis. *Psychological Bulletin*, *128*, 203–235. doi:10.1037/0033-2909.128.2.203.
- Hedden, T., Ketay, S., Aron, A., Markus, H. R., & Gabrieli, J. D. E. (2008). Cultural influences on neural substrates of attentional control. *Psychological Science*, *19*, 12–16. doi:10.1111/j.1467-9280.2008.02038.x.
- Herr, P. M., Sherman, S. J., & Fazio, R. H. (1983). On the consequences of priming: assimilation and contrast effects. *Journal of Experimental Social Psychology*, *19*, 323–340. doi:10.1016/0022-1031(83)90026-4.
- Imada, T., Carlson, S. M., & Itakura, S. (2013). East–west cultural differences in context-sensitivity are evident in early childhood. *Developmental Science*, *16*, 198–208. doi:10.1111/desc.12016.
- Ishii, K. (2013). Culture and the mode of thought: a review. *Asian Journal of Social Psychology*, *16*, 123–132. doi:10.1111/ajsp.12011.
- Ishii, K., Miyamoto, Y., Rule, N. O., & Toriyama, R. (2014). Physical objects as vehicles of cultural transmission: maintaining harmony and uniqueness through colored geometric patterns. *Personality and Social Psychology Bulletin*, *40*, 175–188. doi:10.1177/0146167213508151.
- Ishii, K., Reyes, J. A., & Kitayama, S. (2003). Spontaneous attention to word content versus emotional tone: differences among three cultures. *Psychological Science*, *14*, 39–46. doi:10.1111/1467-9280.01416.
- Ji, L. (2008). The leopard cannot change his spots, or can he? Culture and the development of lay theories of change. *Personality and Social Psychology Bulletin*, *34*, 613–622. doi:10.1177/0146167207313935.
- Ji, L., Nisbett, R. E., & Su, Y. (2001). Culture, change, and prediction. *Psychological Science*, *12*, 450–456. doi:10.1111/1467-9280.00384.
- Kitayama, S., Duffy, S., Kawamura, T., & Larsen, J. T. (2003). Perceiving an object and its context in different cultures: a cultural look at new look. *Psychological Science*, *14*, 201–206. doi:10.1111/1467-9280.02432.
- Kuwabara, M., & Smith, L. B. (2012). Cross-cultural differences in cognitive development: attention to relations and objects. *Journal of Experimental Child Psychology*, *113*, 20–35. doi:10.1016/j.jecp.2012.04.009.
- Kuwabara, M., Son, J. Y., & Smith, L. B. (2011). Attention to context: U.S. and Japanese children's emotional judgments. *Journal of Cognition and Development*, *12*, 502–517. doi:10.1080/15248372.2011.554927.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: implications for cognition, emotion, and motivation. *Psychological Review*, *98*, 224–253. doi:10.1037/0033-295X.98.2.224.
- Masuda, T., Ellsworth, P. C., Mesquita, B., Leu, J., Tanida, S., & Veerdonk, E. V. (2008). Placing the face in context: cultural differences in the perception of facial emotion. *Journal of Personality and Social Psychology*, *94*, 365–381. doi:10.1037/0022-3514.94.3.365.
- Masuda, T., & Nisbett, R. E. (2001). Attending holistically versus analytically: comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology*, *81*, 922–934. doi:10.1037/0022-3514.81.5.922.
- Matsumoto, D., Yoo, S. H., Fontaine, J., Anguas-Wong, A. M., Ariola, M., Ataca, B., et al. (2008). Mapping expressive differences around the world: the relationship between emotional display rules and individualism versus collectivism. *Journal of Cross-Cultural Psychology*, *39*, 55–74. doi:10.1177/0022022107311854.
- McClure, E. B. (2000). A meta-analytic review of sex differences in facial expression processing and their development in infants, children, and adolescents. *Psychological Bulletin*, *126*, 424–453. doi:10.1037/0033-2909.126.3.424.
- Miyake, K., Campos, J., Kagan, J., & Bradshaw, D. L. (1986). Issues in socioemotional development. In H. Stevenson, H. Azuma, & K. Hakuta (Eds.), *Child development and education in Japan* (pp. 239–261). New York: Freeman.
- Morris, M. W., & Peng, K. (1994). Culture and cause: American and Chinese attributions for social and physical events. *Journal of Personality and Social Psychology*, *67*, 949–971. doi:10.1037/0022-3514.67.6.949.
- Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: holistic versus analytic cognition. *Psychological Review*, *108*, 291–310. doi:10.1037/0033-295X.108.2.291.
- Norenzayan, A., Smith, E. E., Kim, B. J., & Nisbett, R. E. (2002). Cultural preferences for formal versus intuitive reasoning. *Cognitive Science*, *26*, 653–684. doi:10.1207/s15516709cog2605\_4.
- Richland, L. E., Chan, T. K., Morrison, R. G., & Au, T. K. F. (2010). Young children's analogical reasoning across cultures: similarities and differences. *Journal of Experimental Child Psychology*, *105*, 146–153. doi:10.1016/j.jecp.2009.08.003.
- Rule, N. O., Freeman, J. B., & Ambady, N. (2013). Culture in social neuroscience: a review. *Social Neuroscience*, *8*, 3–10. doi:10.1080/17470919.2012.695293.
- Senzaki, S., Masuda, T., Takada, A., & Okada, H. (2016). The communication of culturally dominant modes of attention from parents to children: a comparison of Canadian and Japanese parent-child conversations during a joint scene description task. *PloS One*, *11*, e0147199. doi:10.1371/journal.pone.0147199.