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One or more? Big or small? Number and size of animate characters in picture books from Japan and the U.S.

We examined the number and size of animate characters illustrated in picture books targeting preschoolers from the U.S. and Japan. Our hypotheses were based on cross-cultural differences found in previous studies of visual attention and visual products. The results found that U.S. picture books had fewer animate characters illustrated than Japanese books, supporting our hypothesis. Our results also found that texts of the U.S. picture books placed more emphasis on animate characters than texts of Japanese books, also supporting our hypothesis. These results highlight that visual products that young children are exposed to early might be an important environmental factor contributing to their development that should be studied further.

Key words: picture books, visual contents, texts, animate characters, culture

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Introduction

Picture books are commonly available for young children (Horst & Houston-Price, 2015). Picture book reading provides powerful inputs that have been shown to facilitate children's development, such as language (e.g., Bus et al., 1995), visual literacy (e.g., Lindauer, 1988), socio-emotional understanding (e.g., Adrian et al., 2005), and memory (e.g., Cornell et al., 1988). However, although the impacts of picture book reading on children's development have been well documented, there have been very limited studies investigating the visual contents of picture books (how picture books are illustrated). This is particularly important to investigate because previous studies have found that the visual contents of books influence how adults read to children (Dyenia et al., 2013; Leech & Rowe, 2014; Ziv et al., 2013).

In the current study, we focused on how the visual contents of picture books might differ across two countries, the U.S. and Japan, that vary in visual attention. Individuals from Western cultures, such as the U.S., attend to the individual and most salient elements of a scene (analytic attention), and individuals from East Asian cultures, such as Japan, attend to the relationships among objects within the scene (holistic attention, see Nisbett & Miyamoto, 2005 for review). For example, when shown a mundane scene of fish in a pond, U.S. adults looked at and remembered the focal object (e.g., fish), whereas Japanese adults fixated on and remembered multiple elements in the scene and their relation to each other (e.g., fish in the pond; Masuda & Nisbett, 2001). Cultural differences in attention and perception have been documented in a wide variety of tasks in adults (Chua et al., 2005; Ishii et al., 2009; Kelly et al., 2010; Masuda & Nisbett, 2006) and children as young as three years old (Duffy et al., 2009; Imada et al., 2013; Kuwabara & Smith, 2012, 2016; Moriguchi et al., 2012; Senzaki et al., 2014).

Previous research investigated whether daily visual environments might influence the attentional differences observed in adults (Miyamoto et al., 2006). For example, Miyamoto et al. (2006) took pictures of U.S. and Japanese street scenes (e.g., a street in front of a post office) and found that U.S. street scenes are visually simpler (e.g., a smaller number of objects) than Japanese street scenes (e.g., a larger number of objects). This study (Miyamoto et al., 2006) also has shown that priming participants with Japanese street scenes made adult participants from the U.S. and Japan attend more holistically than priming participants with the U.S. street scenes, suggesting that visual environments that we encounter daily guide and train how we process information visually. Visual products that adults and children encounter regularly, such as newspapers (Morris & Peng, 1994), advertisements (Cheng & Schweitzer, 1996; Kim & Markus, 1999), websites (Wang et al., 2012), and textbooks used in elementary schools (Imada, 2012) followed a similar trend. The U.S. visual products contained less information than Japanese visual products. Another study investigated visual content differences between the U.S. and Japanese picture books targeting infants/toddlers and preschool-aged child-

ren and found that picture books for preschool-aged children also follow a similar trend – the U.S. picture books included a fewer number of objects than Japanese picture books (Kuwabara et al., 2020). These findings from research on visual products suggest that the amount of visual information (texts and illustrations) that we encounter regularly might train and sustain specific attention patterns.

However, visual environments we encounter regularly include other aspects (than the amount of information) that might also be important for attention. For example, studies have shown that the animacy of objects captures attention differently: animate objects capture human attention more than inanimate objects (Calvillo & Jackson, 2014; Scholl & Tremoulet, 2000). Previous studies have also found that size matters for attention: larger objects in a visual field capture attention regardless of task demands (Proulx, 2010). Young children also attended and learned more about objects that were larger in their view than those objects that were smaller in their view (Pereira et al., 2014).

Since cultural differences in attention have been observed as young as three years of age, it is critical to investigate the differences in visual products that target preschool-aged children to understand whether the differences (if any) might align with previous findings in attention. The current study focused on one such visual product that young children encounter often, that is, picture books. Our first research question examined the potential differences in the number and size of animate characters, which have not been studied previously and might give another insight into how the visual products that target young children might contribute to visual attention. Because many researchers have stated that illustrations in books work collaboratively with texts of books to create stories (Nikolaeva & Scott, 2000), our second research question examined whether texts of U.S. and Japanese picture books emphasize the number and size of animate characters illustrated differently.

Based on previous studies of visual products (e.g., Imada, 2012; Kuwabara et al., 2020), the hypothesis for the number of animate characters was that U.S. books would contain fewer animate characters than Japanese books. For the size of animate characters, there are no previous studies investigating the size of characters that we know of that our hypothesis could be based on. However, if a page contains more characters, the character size should be smaller because the page size is limited. Therefore, the hypothesis was based on our assumption about the number of characters that U.S. books, which would have a smaller number of animate characters would have bigger animate characters than Japanese books. We also examined whether texts of picture books emphasized the animate characters illustrated differently by country. Based on previous studies of visual attention (see Nisbett & Miyamoto, 2005 for review), we hypothesized that U.S. books would place more emphasis on animate characters referred to by texts than Japanese books. Specifically, for the number of characters, we expected that most animate characters illustrated in U.S. books would be referred by texts, which would facilitate focused attention on those characters, and in Japanese books, a smaller

number of animate characters illustrated would be referred by texts, which would make it easier to scan other characters and contextual information. We expected similar trends for character sizes, such that the U.S. books would place more emphasis on having text-referred animate characters bigger than Japanese books.

Methods

Sampling Books

The book list created by Kuwabara et al. (2020) was used in the current study, which included 23 books per country targeting preschool-aged children. The list of books in Kuwabara et al. (2020) was selected using criteria considering representative, culturally unbiased, and accessible books that were recommended by major city libraries. Each page of the picture books was scanned to code the character and page sizes using NIH ImageJ software (Rasband, 2018). Scanned images included two pages connected by the spine of the book, which is the image that children would typically see when the book opens naturally. Each book was scanned this way because some pages included images across the spine. Picture books from the U.S. ranged from 11 to 34 scanned pages ($M = 17.96$) and picture books from Japan ranged from nine to 23 scanned pages ($M = 14.96$). See more information about books in the supplemental material submitted by Kuwabara et al. (2020).

Coding

Animacy was defined as anything with an eye or limb (see Opfer & Gelman, 2011 for review). When Japanese books used *-san* to refer to inanimate objects, such as a truck, it was also considered as an animate character because *-san* is the honorific title (similar to Mr. or Mrs. in English), which indicates animacy. The pages that were not part of a story, such as a cover page, were not coded.

Number of Characters

All animate characters were counted for each page of books by two human coders. Two coders coded all pages and their measurements were highly reliable ($\alpha = .99$).

Character Size

All animate characters were measured for size using NIH ImageJ (Rasband, 2018) Measure Area function, which measures the area of selection in square pixels. The size of each character was measured using the rectangle area selection tool. The perimeter of each character, the furthest corner points, was surroun-

Figure 1. *Sample Book Page From a Japanese Book*



Note. Sample book page from a Japanese book, GURI and GURA (Text © Reiko Nakagawa 1963, Illustration © Yuriko Yamawaki 1963, Published by Fukuinkan Shoten Publishers Inc.). The black bold line (imposed on the faint line originally given by the NIH Image J software) shows the perimeter of the character measured by the NIH Image J Measure Area function using the rectangle area selection tool.

ded by the rectangle area selection tool (see an example in Figure 1). Two coders coded about 30% of all characters (775 out of 2552 characters) separately. Their measurements were highly reliable ($\alpha = .97$).

Page Size

Because scanned page sizes of books differ, each scanned page size was also measured using NIH ImageJ (Rasband, 2018) Measure Area function similar to how character sizes were measured.

Text Coding

A coder fluent in both languages (English and Japanese) read texts and marked which animate characters were referred to by texts for each page of the book. To account for language differences, the coder coded all of the following incidents as referring to the characters; explicit naming of the character (e.g., George), and implicit naming by pronouns (e.g., I/she/they), and implicit naming by quote done by a character (e.g., “Cats go meow” said by George’s mother, but the text did not say explicitly “said George’s mother,” see Table 1).

For explicit naming of a character, if the character was mentioned explicitly more than once, those characters were coded as mentioned for the number of times referred to by the text. For example, if the text mentioned “Bark, George. Bark, George.” George was counted as referred twice and his image size was counted twice. Because Japanese lacks plurals and English requires them, when the text refers to a character or characters (e.g., a dog or dogs in English and inu or pluralizing suffixes, such as -tachi or -ra (e.g., inu-tachi) in Japanese) and illustra-

tion displayed multiple animate characters (e.g., multiple illustrated dogs), one of the characters in the illustration was counted as referred to account for language differences in pluralization.

For implicit naming by pronouns, all possessive adjectives (e.g., my/her/their) were excluded to eliminate the potential redundancy in the sentence (e.g., “I like my dress”). Plurals (e.g., they, we) were dealt with in the same manner as explicit naming.

To be considered implicit naming by a quote, the quote should not be explicitly labeled by a character (e.g., “Bark, George” said by George’s mother) to reduce redundancy with the explicit naming. For the quotes that were said by a character on the page but the quotation was not clearly labeled who said it (e.g., “Let’s cook”) and there were multiple characters illustrated (e.g., cats) that could have said the quote, one of the characters in the page (e.g., one cat) was counted as referred because the quotation was said by one character, not multiple characters. For the quotes that are not clear who said them, those quotes were excluded from the analysis.

For plurals, we used the average size of characters as the most representative of characters mentioned because previous studies have found that adults and children can visually focus on one thing at a time (Brooks et al., 2003; VanRullen et al., 2007). Another reason we used the average size rather than the biggest size among the mentioned characters is that character size is one cue that could attract attention, but other cues, such as color and location, are also used in our visual systems to guide attention (Mély et al., 2016). Since we do not know which visual cues children might be more drawn to, the average size of referred plural characters as the representative size was used.

Results

Based on illustration (visual only), we first examined whether the number and size of animate characters illustrated per page differ by country. We hypothesized that U.S. books would contain a smaller number of animate characters that would be larger in size than Japanese books. For the number of animate characters, a total number of animate characters per page as a dependent variable and country as a factor were entered into an analysis of covariance (ANCOVA), controlling for books as a covariate since each book included a varied number of

Table 1. *Frequency of Explicit Naming, Implicit Naming by Pronouns, and Implicit Naming by Quotes per Country*

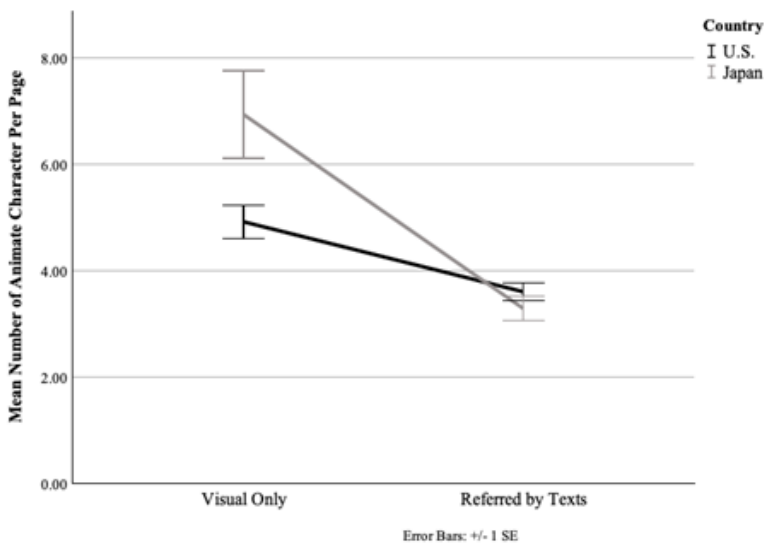
	Explicit naming	Implicit naming by pronouns	Implicit naming by quotes
U.S.	683	688	67
Japan	750	115	271

pages). The analysis shows that there was a smaller number of animate characters illustrated in the U.S. books ($M = 5.23$, $SD = 6.54$) than in Japanese books ($M = 6.94$, $SD = 15.26$), $F(1, 758) = 3.82$, $p = .051$, $\eta^2 = .005$, although the effect size was small, supporting our hypothesis. For the size of animate characters, because page sizes varied across books, the proportion of animate character size over the page size was calculated to standardize the character size. This standardization converted to how much of the page is covered by illustrations of animate characters. The sum of the proportion of animate character sizes over page size as a dependent variable and country as a factor were entered into an ANCOVA, controlling for books as a covariate since each book included a varied number of pages. The analysis reveals that the animate characters illustrated in the U.S. books ($M = .21$, $SD = .23$) were smaller in proportion than Japanese books ($M = .25$, $SD = .22$), $F(1, 758) = 3.46$, $p = .063$, $\eta^2 = .005$, contrary to our hypothesis, although the effect size was small.

To account for language differences, the number and size of characters that were explicitly named, implicitly named by pronouns, and implicitly named by quote were summed. A repeated-measures ANCOVA was performed to examine how much texts of picture books emphasized illustrated animate characters. For the number of animate characters, a repeated-measures ANCOVA was performed to examine the effect of texts by comparing the number of animate characters illustrated per page (visual only) and the number of animate characters referred to by texts, controlling for books as a covariate. The analysis showed the main effect of texts with a small effect size, $F(1, 756) = 7.63$, $p = .006$, $\eta^2 = .01$, and the interaction between texts and country with a small effect size, $F(1, 756) = 5.33$, $p = .021$, $\eta^2 = .007$. A paired-samples *t* test, entering the number of animate characters illustrated (visual only) and the number of animate characters referred to by texts as a pair, was performed for each country. A paired-samples *t* test for the U.S. picture books revealed that there were significantly more animate characters illustrated ($M = 5.23$, $SD = 6.54$) than the number of animate characters texts referred to ($M = 3.47$, $SD = 3.28$), $t(412) = 4.20$, $p = .001$, $d = .21$, with a small effect size. This trend was similar for Japanese books – there were more animate characters illustrated ($M = 6.94$, $SD = 15.26$) than the number of animate characters texts referred to ($M = 3.29$, $SD = 4.28$), $t(345) = 4.47$, $p = .001$, $d = .24$, with a small effect size. As seen in Figure 2, the U.S. books included a fewer number of animate characters illustrated per page, but most of these animate characters (66.3%) were referred to by texts whereas Japanese books included larger number of animate characters illustrated per page, but only less than half of those characters (47.4%) were referred to by texts, supporting our hypothesis that the texts of the U.S. books placed more emphasis on animate characters than Japanese books.

For the size of animate characters, a repeated-measures ANCOVA was performed to examine the effect of texts by comparing the size of animate characters illustrated per page (visual only) and the size of animate characters referred to by texts, controlling for the books as a covariate, similar to the number of animate

Figure 2. Line Graph of the Number of Animate Characters Per Page for Visual Only and Referred by Texts by Country



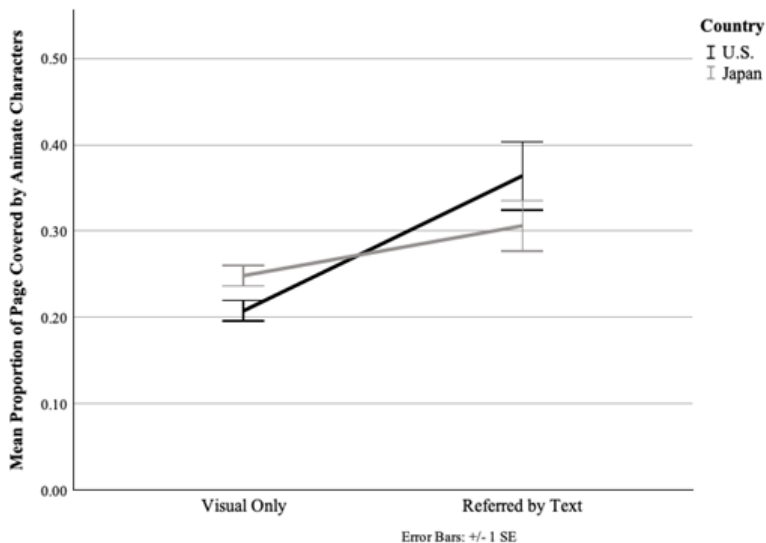
Note. Line graph showing the interaction between the number of animate characters illustrated (visual only) and number of animate characters referred to by texts. The black line shows the data from the U.S. picture books and the gray line displays data from Japanese picture books.

characters. The analysis showed the main effect of texts with a small to medium effect size, $F(1, 756) = 34.13, p = .001, \eta^2 = .04$, and the interaction between texts and country with a small effect size, $F(1, 756) = 7.09, p = .008, \eta^2 = .009$. A paired-samples *t* test, entering the size of animate characters illustrated (visual only) and the size of animate characters referred to by texts as a pair, was performed for each country. A paired-sample *t* test for the U.S. picture books revealed that the animate characters referred to by texts ($M = .35, SD = .78$) were bigger than those visually illustrated ($M = .21, SD = .23$), $t(412) = 4.67, p = .001, d = .23$ with a small effect size. Similarly, for Japanese books, the animate characters referred to by texts ($M = .31, SD = .54$) were bigger than those visually illustrated ($M = .25, SD = .22$), $t(345) = 2.21, p = .028, d = .12$, with a small effect size. As seen in Figure 3, the texts of the U.S. books emphasized more of the animate characters by size than Japanese books, supporting our hypothesis.

Discussion

In the current study, we examined the visual contents of picture books to see whether the visual products that target young children might support the findings from cultural differences in visual attention (see Nisbett & Miyamoto, 2005 for review). Specifically, we tested the potential differences in the number and size of

Figure 3. *Line Graph of the Size of Animate Characters Per Page for Visual Only and Referred by Texts by Country.*



Note. Line graph showing the interaction between the size of animate characters illustrated (visual only) and the size of animate characters referred to by texts. The black line shows the data from the U.S. picture books and the gray line displays data from Japanese picture books.

animate characters, which have been found to capture human attention (Calvillo & Jackson, 2014; Scholl & Tremoulet, 2000) but have not been studied in visual products cross-culturally. Our hypotheses were based on the cultural differences in visual attention (see Nisbett & Miyamoto, 2005 for review) and visual products (Cheng & Schweitzer, 1996; Imada, 2012; Kim & Markus, 1999; Kuwabara et al., 2020; Miyamoto et al., 2006; Morris & Peng, 1994; Wang et al., 2012). We hypothesized that U.S. books would contain a smaller number of animate characters that would be larger in size than Japanese books. Our results showed that the U.S. books included a smaller number of animate characters than Japanese books as expected. However, contrary to our hypothesis, the size of animate characters illustrated in U.S. books was smaller than in Japanese books, which might suggest that the size of animate characters visually alone might not contribute to culturally specific attention patterns. We also examined whether the texts of picture books emphasized the animate characters illustrated differently by country. We hypothesized that U.S. books would place more emphasis on animate characters referred to by texts than Japanese books. Our results found that the U.S. books included a smaller number of animate characters illustrated per page, but most of these animate characters were referred to by texts and referred characters were larger, whereas Japanese books included more animate characters illustrated per page, but only about half of those characters were referred to by texts and referred

characters were smaller, supporting our hypothesis that the texts of the U.S. books placed more emphasis on animate characters than Japanese books.

Our results on picture books, visual products that young children encounter regularly, align well with the previous findings on visual environments and visual products, showing that Japanese picture books included more visual information by having more animate characters illustrated than U.S. books. Our results also align well with attentional differences observed in previous studies (see Nisbett & Miyamoto, 2005 for review). Having fewer animate characters, which was found in U.S. books, might make the analytic attentional style easier because fewer animate characters allow for focused attention to those few. Having more animate characters, which was found in Japanese books, might facilitate a holistic attention style because having a holistic attention style might be more beneficial to scan the scene that contains animate characters scattered around in a scene. Based on the finding from Evans and Saint-Aubin (2005) that texts of books guided young children's attention to the text-referred characters or objects during the book reading session, more visually emphasized text-referred characters found in U.S. books might also help sustain attention to referred animate characters whereas less visually emphasized text-referred characters found in Japanese books might make it easier to transition from referred characters to other characters and surrounding contexts. Therefore, these small visual differences in the environment of young children might contribute to the differences in the development of culturally specific attention patterns.

Since ours was a descriptive study, the causality between the number and size of animate characters and visual attention in children cannot be drawn. Most of our results had a small effect size, suggesting the differences we observed in this study might not apply to other visual products or other genres of books. Due to the limited sample size and a focus on picture books in our study, our results might not generalize to other genres, such as educational books. In this study, we counted implicit naming via quotes as naming events to account for potential language differences between English and Japanese. However, we do not know whether young children might have different levels of understanding of these quotes based on their developmental levels, who read to them, and their cultures.

Our results raise interesting future questions. Since our results focused on the visual contents of picture books, a future study could examine how visual content differences found in this study might contribute to young children's attention across countries. Since our results also found that texts of picture books emphasized visual contents differently across countries, another future study could see how caregivers of each country read these visually different books and how caregivers might guide and navigate children's attention while reading those visually different books across countries. It would also be interesting to see what young children might learn from these visually different books because different visual cues might contribute to different attentional patterns, which in turn can influence what is learned from those visual inputs.

The current study contributes to the notion that visual products that young children are exposed to in their daily lives might contribute to and sustain the attentional differences found in previous studies. Therefore, we should explore more of these environmental factors and what influences these small, yet powerful differences might have on children's development.

Conflict of Interest Disclosure

The Authors report there are no competing interests to declare.

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Research Ethics Statement

Data collection and analyses were conducted on publically available materials (picture books) - no human subjects were involved in the study. Publishers and authors granted permission to use example images in the manuscript as Figures.

Data Availability Statement

Data will be made available upon reasonable request to the corresponding author.

Authorship Details

Megumi Kuwabara: research concept and design, collection and/or assembly of data, data analysis and interpretation, writing the article, critical revision of the article, final approval of the article. Bonnie Perez: collection and/or assembly of data, data analysis and interpretation, writing the article.

References

- Adrian, J. E., Clemente, R. A., Villanueva, L., & Rieffe, C. (2005). Parent-child picture-book reading, mothers' mental state language and children's theory of mind. *Journal of Child Language, 32*(3), 673–686. <https://doi.org/10.1017/S0305000905006963>
- Brooks, P. J., Hanauer, J. B., Padowska, B., & Rosman, H. (2003). The role of selective attention in preschoolers' rule use in a novel dimensional card sort. *Cognitive Development, 18*(2), 195–215. [https://doi.org/10.1016/S0885-2014\(03\)00020-0](https://doi.org/10.1016/S0885-2014(03)00020-0)
- Bus, A. G., van IJzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research, 65*(1), 1–21. <https://doi.org/10.3102/00346543065001001>
- Calvillo, D. P., & Jackson, R. E. (2014). Animacy, perceptual load, and inattention blindness. *Psychonomic Bulletin & Review, 21*(3), 670–675. <https://doi.org/10.3758/s13423-013-0543-8>
- Cheng, H., & Schweitzer, J. C. (1996). Cultural values reflected in Chinese and U.S. television commercials. *Journal of Advertising Research, 36*(3), 27–46.
- Chua, H. F., Boland, J. E., & Nisbett, R. E. (2005). Cultural variation in eye movements during scene perception. *Proceedings of the National Academy of Sciences, 102*(35), 12629–12633. <https://doi.org/10.1073/pnas.0506162102>
- Cornell, E. H., Sénéchal, M., & Broda, L. S. (1988). Recall of picture books by 3-year-old children: Testing and repetition effects in joint reading activities. *Journal of Educational Psychology, 80*, 537–542. <https://doi.org/10.1037/0022-0663.80.4.537>
- 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*(3), 351–359. <https://doi.org/10.1016/j.jecp.2008.06.006>
- Dynia, J. M., Justice, L. M., Pentimonti, J. M., Piasta, S. B., & Kaderavek, J. N. (2013). Text features and preschool teachers' use of print referencing. *Journal of Research in Reading, 36*(3), 261–279. <https://doi.org/10.1111/j.1467-9817.2011.01502.x>
- Evans, M. A., & Saint-Aubin, J. (2005). What children are looking at during shared storybook reading. *Psychological Science, 16*(11), 913–920.
- Horst, J. S., & Houston-Price, C. (2015). Editorial: An open book: What and how young children learn from picture and story books. *Frontiers in Psychology, 6*. <https://www.frontiersin.org/articles/10.3389/fpsyg.2015.01719>
- Imada, T. (2012). Cultural narratives of individualism and collectivism: a content analysis of textbook stories in the United States and Japan. *Journal of Cross-Cultural Psychology, 43*(4), 576–591. <https://doi.org/10.1177/0022022110383312>

- Imada, T., Carlson, S. M., & Itakura, S. (2013). East–West cultural differences in context-sensitivity are evident in early childhood. *Developmental Science, 16*(2), 198–208. <https://doi.org/10.1111/desc.12016>
- Ishii, K., Tsukasaki, T., & Kitayama, S. (2009). Culture and visual perception: Does perceptual inference depend on culture? *Japanese Psychological Research, 51*(2), 103–109. <https://doi.org/10.1111/j.1468-5884.2009.00393.x>
- Kelly, D., Mielle, S., & Caldara, R. (2010). Culture shapes eye movements for visually homogeneous objects. *Frontiers in Psychology, 1*. <https://www.frontiersin.org/articles/10.3389/fpsyg.2010.00006>
- Kim, H., & Markus, H. R. (1999). Deviance or uniqueness, harmony or conformity? A cultural analysis. *Journal of Personality and Social Psychology, 77*, 785–800. <https://doi.org/10.1037/0022-3514.77.4.785>
- Kuwabara, M., Alonso, J., & Ayala, D. (2020). Cultural differences in visual contents in picture books. *Frontiers in Psychology, 11*. <https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00304>
- Kuwabara, M., & Smith, L. B. (2012). Cross-cultural differences in cognitive development: Attention to relations and objects. *Journal of Experimental Child Psychology, 113*(1), 20–35. <https://doi.org/10.1016/j.jecp.2012.04.009>
- Kuwabara, M., & Smith, L. B. (2016). Cultural differences in visual object recognition in 3-year-old children. *Journal of Experimental Child Psychology, 147*, 22–38. <https://doi.org/10.1016/j.jecp.2016.02.006>
- Leech, K. A., & Rowe, M. L. (2014). A comparison of preschool children’s discussions with parents during picture book and chapter book reading. *First Language, 34*(3), 205–226. <https://doi.org/10.1177/0142723714534220>
- Lindauer, S. L. K. (1988). Wordless books: An approach to visual literacy. *Children’s Literature in Education, 19*(3), 136–142. <https://doi.org/10.1007/BF01127091>
- 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. <https://doi.org/10.1037/0022-3514.81.5.922>
- Masuda, T., & Nisbett, R. E. (2006). Culture and change blindness. *Cognitive Science, 30*(2), 381–399. https://doi.org/10.1207/s15516709cog0000_63
- Mély, D. A., Kim, J., McGill, M., Guo, Y., & Serre, T. (2016). A systematic comparison between visual cues for boundary detection. *Vision Research, 120*, 93–107. <https://doi.org/10.1016/j.visres.2015.11.007>
- Miyamoto, Y., Nisbett, R. E., & Masuda, T. (2006). Culture and the physical environment: Holistic versus analytic perceptual affordances. *Psychological Science, 17*(2), 113–119. <https://doi.org/10.1111/j.1467-9280.2006.01673.x>
- Moriguchi, Y., Evans, A. D., Hiraki, K., Itakura, S., & Lee, K. (2012). Cultural differences in the development of cognitive shifting: East–West comparison. *Journal of Experimental Child Psychology, 111*(2), 156–163. <https://doi.org/10.1016/j.jecp.2011.09.001>

- 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. <https://doi.org/10.1037/0022-3514.67.6.949>
- Nikolajeva, M., & Scott, C. (2000). The dynamics of picturebook communication. *Children's Literature in Education*, *31*(4), 225–239. <https://doi.org/10.1023/A:1026426902123>
- Nisbett, R. E., & Miyamoto, Y. (2005). The influence of culture: Holistic versus analytic perception. *Trends in Cognitive Sciences*, *9*(10), 467–473. <https://doi.org/10.1016/j.tics.2005.08.004>
- Opfer, J. E., & Gelman, S. A. (2011). Development of the animate-inanimate distinction. In *The Wiley-Blackwell handbook of childhood cognitive development, 2nd ed* (pp. 213–238). Wiley Blackwell.
- Pereira, A. F., Smith, L. B., & Yu, C. (2014). A bottom-up view of toddler word learning. *Psychonomic Bulletin & Review*, *21*(1), 178–185. <https://doi.org/10.3758/s13423-013-0466-4>
- Proulx, M. J. (2010). Size matters: Large objects capture attention in visual search. *PLOS One*, *5*(12), e15293. <https://doi.org/10.1371/journal.pone.0015293>
- Rasband, W.S. (2018). *ImageJ* (Version 1.51). U. S. National Institutes of Health, Bethesda, Maryland, USA. Retrieved from <https://imagej.nih.gov/ij/>.
- Scholl, B. J., & Tremoulet, P. D. (2000). Perceptual causality and animacy. *Trends in Cognitive Sciences*, *4*(8), 299–309. [https://doi.org/10.1016/S1364-6613\(00\)01506-0](https://doi.org/10.1016/S1364-6613(00)01506-0)
- Senzaki, S., Masuda, T., & Nand, K. (2014). Holistic versus analytic expressions in artworks: Cross-cultural differences and similarities in drawings and collages by Canadian and Japanese school-age children. *Journal of Cross-Cultural Psychology*, *45*(8), 1297–1316. <https://doi.org/10.1177/0022022114537704>
- VanRullen, R., Carlson, T., & Cavanagh, P. (2007). The blinking spotlight of attention. *Proceedings of the National Academy of Sciences*, *104*(49), 19204–19209. <https://doi.org/10.1073/pnas.0707316104>
- Wang, H., Masuda, T., Ito, K., & Rashid, M. (2012). How much information? East Asian and North American cultural products and information search performance. *Personality and Social Psychology Bulletin*, *38*(12), 1539–1551. <https://doi.org/10.1177/0146167212455828>
- Ziv, M., Smadja, M.-L., & Aram, D. (2013). Mothers' mental-state discourse with preschoolers during storybook reading and wordless storybook telling. *Early Childhood Research Quarterly*, *28*(1), 177–186. <https://doi.org/10.1016/j.ecresq.2012.05.005>