

**Culture and Attention: Recent Empirical Findings
and New Directions in Cultural Psychology**

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Abstract

Over the past 3 decades, cultural psychologists have empirically investigated the influence of cultural meaning systems on human psychology. Under the rubric of holistic versus analytic thought, researchers have demonstrated that there are substantial cultural variations in social cognition, and that such variations are observable even in so-called fundamental psychological processes, such as attention. The aim of this paper is to review 3 major themes in culture and attention: (1) culture and attention to nonsocial scenes, (2) culture and attention to social scenes, and (3) culture and aesthetics. The paper also discusses 4 major strands of research that could be considered important candidates to further advance the understanding of culture and attention: (1) research on “culture → human psychological processes,” where we investigate how culture influences modes of attention; (2) research on “human psychology → cultural processes,” where we investigate how those who hold a specific mode of attention create cultural products and tangible representations of culturally shared meanings; (3) research on cultural neuroscience, where we investigate underlying mechanisms and processes of specific modes of attention; and (4) research on cultural transmission processes, where we investigate how specific modes of attention is taught by adults and internalized by children.

Culture and Attention: Recent Empirical Findings and New Directions in Cultural Psychology

1 | Introduction

Over the past three decades, cultural psychology—an interdisciplinary field that integrates psychology, anthropology, linguistics, philosophy, and neuroscience—has empirically investigated the influence of cultural meaning systems on human psychology (Bruner, 1990; Geertz, 1973; Miller, 1999; Shweder, 1991). One of the major theoretical frameworks in this area of research, developed by Nisbett and colleagues (Masuda, Russell, Li, & Lee, 2017; Nisbett, 2003; Nisbett & Masuda, 2003; Nisbett & Miyamoto, 2005; Nisbett, Peng, Choi, & Norenzayan, 2001), contrasted two kinds of thinking styles: analytic and holistic. The *analytic thinking style*, dominant in Western cultures such as those in Western Europe and North America, is characterized by discourses that emphasize an object-oriented focus in visual attention (selectively focusing more on objects than on context). In contrast, the *holistic thinking style*, dominant in East Asian cultures such as China, Korea, and Japan, is characterized by discourses that emphasize a context-oriented focus of attention (attending to objects in relation to their context). Based on this assumption, a substantial number of empirical studies have demonstrated that there are systematic cultural variations in aspects of social cognition such as human inference, attribution, and judgment (see Masuda, Russell, et al., 2017, for review).

Our group has also demonstrated that such differences in thinking styles even influence basic psychological processes, notably *attention*. The aim of this paper is to review three major themes on the issue of culture and attention: (1) culture and attention to nonsocial scenes, (2) culture and attention to social scenes, and (3) culture and aesthetics. The paper also discusses the implications of attention research for advancing cultural psychology in new directions.

1.1 | Culture and attention to nonsocial scenes

Needless to say, there are universal aspects of human attention. However, such basic psychological processes are often influenced by top-down attention processes—such as knowledge, expectation, motivation, feelings, values, and goals (Bruner, 1957; Bruner & Goodman, 1947)—as opposed to bottom-up processes (Chun & Wolfe, 2001; Posner, 1980). Researchers have assumed that when individuals' attention was top-down, cross-cultural variation in patterns of attention would also be substantial because members of a given cultural community interpret the information in a culturally meaningful manner, and such interpretation affects their mode of attention (Senzaki, Masuda, & Ishii, 2014). A plethora of attention studies have indeed demonstrated that East Asians are more likely than their North American counterparts to endorse context-sensitive patterns of attention (Boduroğlu, Shah, & Nisbett, 2009; Doherty, Tsuji, & Phillips, 2008; Ishii & Kitayama, 2002; Ishii, Reyes, & Kitayama, 2003; Ji, Peng, & Nisbett, 2000; Kitayama, Duffy, Kawamura, & Larsen, 2003; Kitayama & Ishii, 2002; Masuda, Akase, Radford, & Wang, 2008; Masuda, Ishii, & Kimura, 2016; Masuda & Nisbett, 2006; Savani & Markus, 2012).

For example, psychologists have long been assuming that modes of attention are basic, culturally invariant psychological processes. However, Masuda and Nisbett (2001) assumed that culturally shared meaning systems would influence people's mode of attention; therefore, even simple narratives based on visual scenes presented on a screen for a short period of time would be affected by such cultural-specific modes of attention. By measuring people's narrative styles as an indirect indicator of their attention, Masuda and Nisbett (2001) examined whether there are any cultural variations in Japanese and European Americans' way of describing visual information. They demonstrated that when asked to describe animated vignettes of underwater

scenes, European Americans tended to selectively refer more to the focal objects, whereas Japanese participants tended to describe both focal objects and contextual information. These results suggest that European Americans, in keeping with their analytic mode of attention, use a strategy of detecting what they think is important and ignoring the peripheral information in the background. In contrast, Japanese people holistically capture the context as a frame of an event and then develop narratives for the focal objects.

Masuda and Nisbett (2001) further tested European American and Japanese recognition styles by targeting their recognition accuracy as an indirect indicator of attention. They first asked participants to evaluate how much they liked animals that appeared in wilderness scenes, and later (in an incidental memory task), to make a recognition judgment and state whether they had seen the animals previously. In this recognition task, the same animals were presented, either in the same wilderness scenes as before or in novel wilderness scenes. The results indicated that both cultures performed well when recognizing congruent images (previously presented animals with their previously matched wilderness scenes). However, when incongruent images were shown (e.g., previously presented animals with novel wildernesses), accuracy decreased for both groups, and accuracy was much poorer for Japanese than for Americans. These findings are the first to show that culture substantially influences human attention, indicating that Japanese tend to holistically bind foregrounds and backgrounds during their processing of scenes more than Americans do. Thus, these results open the field for researchers to further investigate the depth of cultural effect on so-called basic psychological processes, using more physiological and neural methodology such as eye tracking, event-related potential (ERP), and functional magnetic resonance imaging (fMRI) research.

Eventually, a series of eye-tracking studies further provided supportive evidence of this assertion by targeting eye-movement pattern as a direct indicator of attention (Chua, Boland, & Nisbett, 2005; Senzaki, Masuda, Ishii, 2014; Zhang & Seo, 2015). For example, Senzaki et al. (2014) demonstrated that although there was no cultural difference in modes of attention when European Canadians and Japanese simply observed animated vignettes of underwater scenes selectively focusing on the foreground information rather than on background information—when Japanese were asked to narrate the story of the scenes, they were more likely than their European Canadian counterparts to allocate their attention to the background. These findings further advance Masuda and Nisbett's (2001) findings by demonstrating the condition under which people's attention becomes culturally invariant (e.g., their attention is usually directed to salient objects in the scene) or culturally specific (e.g., constructing narratives tends to activate culturally dominant modes of attention), thus suggesting the importance of a balanced view of basic psychological processes (e.g., Imai & Masuda, 2013).

Recent neuroscience research has also investigated *to what extent* such top-down processes influence the activation of neural responses during attention tasks. For example, Masuda, Russell, Chen, Hioki, and Caplan (2014) assumed that cultural variations in attention are not only observable in people's behavioral responses and patterns of eye movement but also deeply rooted in their neural processing mechanism. To initiate this investigation, we targeted their neural activities using an ERP methodology, since identifying the neural components that direct variant attention patterns is important to further elucidate mechanisms of culturally specific modes of attention. They analyzed the activation patterns of European Canadians and Japanese during Masuda and Nisbett's (2001) recognition task. Furthermore, Masuda et al. (2014) focused on FN400 activation, which is thought to indicate memory processes related to

the recognition of the discrepancy between old and new images (e.g., Tsivilis, Otten, & Rugg, 2001). The results indicated that both European Canadians and Japanese showed similar FN400 responses. However, this increased processing recruited for the old animal; the new background incongruent pair only affected behaviors for the more holistic Japanese, suggesting that the more Japanese processed the background (seen through stronger FN400s), the more likely they were to mistake the old animal for being new. This provides evidence that Japanese bind contextual information in their memory judgments of the target objects.

Similarly, Goto, Ando, Huang, Yee, and Lewis (2010) measured the extent to which people naturally attend to contextual information when asked to make judgments of focal objects. They compared Asian Americans' and European Americans' N400 ERPs to scenes consisting of foreground objects placed on background scenes that were either congruent (e.g., a crab naturally belongs on the beach) or incongruent (e.g., a crab does not fit as well with a parking lot). Related to the properties of the N400, a stronger N400 response to the incongruent objects than to the congruent objects would suggest that the person was taking into consideration the foreground–background semantic fit. The results indicated that Asian Americans showed a stronger N400 response to the incongruent objects (vs. congruent objects) than their North American counterparts did, suggesting that Asian Americans are indeed attentive to the relationship between the foreground object and the background.

Finally, developmental research investigated the emergence timing of culturally dominant patterns of attention. Cultural psychologists assume that these cultural variations in attention are mainly attributable to cultural practices that members of a given culture have experienced since birth through multiple interactions with their caregivers, peers, and teachers, with children gradually internalizing attention patterns through such scaffolding processes (Rogoff, 2003,

2011; Wood, Bruner, & Ross, 1976). To date, only a few studies have successfully addressed the issue of exactly when and how children's mode of attention becomes culturally specific.

Therefore, recent research has extensively investigated the timing of the emergence of culturally dominant patterns of attention.

For example, Imada, Carlson, and Itakura (2013) focused on children's susceptibility to an optical illusion and their description styles as indirect indicators of attention. They found cultural differences in susceptibility to the Ebbinghaus optical illusion. Participants were presented with two circles of slightly different sizes. When these circles are presented alone, it is not so difficult to indicate which of the circles is larger than the other. However, if the large circle is surrounded by several larger circles, and the small circle is surrounded by several smaller circles, people are influenced by the optical illusion and experience difficulty indicating the larger circle. Their judgment errors are used as an indicator of context sensitivity with regard to abstract images. The results indicated that cultural-specific modes of attention started to emerge around the age of 6 to 7 for Japanese and American children, respectively, and became substantial at 8 to 9 years of age. That is, Japanese children were more susceptible to the illusion than were their American counterparts, suggesting that Japanese children's context sensitivity develops gradually over time.

Senzaki, Masuda, Takada, and Okada (2016) investigated the development of culturally unique narratives by adding a subsequent parent-child dyadic engagement component, in which children first engaged in the attention task alone and then, after a break, engaged in a conceptually similar task with their parent. The results indicated that 4- to 9-year-old children did not show culturally specific modes of attention when they engaged in the task alone. However, when parents and children jointly engaged in the task, cultural differences emerged, with only

older children (ages 7–9) showing the cultural patterns and mirroring parental narrative styles (i.e., analytic narratives in Canada and holistic narratives in Japan). These findings support Bruner's (1990) assertion that communication styles and narratives activate culturally shared meanings, resulting in the endorsement of culturally dominant cognitive and perceptual patterns.

1.2 | Culture and attention to social scenes

Do people directly internalize culturally specific modes of attention by being exposed to abstract, nonsocial stimuli? Or is their mode of attention to such stimuli a generalized by-product of their attention to more social stimuli? While this issue has been debated and no conclusive evidence has been found so far, several researchers have advocated theoretical frameworks that support the latter case. For example, under the rubric of the social orientation hypothesis, Varnum, Grossmann, Kitayama, and Nisbett (2010) posited that social orientation plays an important role in the development of cultural-specific social practices, which leads people to develop cultural-specific patterns of cognition: Those who have been exposed to an independent social orientation (e.g., in North American societies) develop an analytic mode of attention, whereas those who have been exposed to an interdependent social orientation (e.g., in East Asian societies) develop a holistic mode of attention. These researchers further speculate that people's modes of attention to social events later generalize to nonsocial events.

In fact, cultural variation in people's attention to social events, such as emotion perception, has been investigated extensively in general psychology as well. Since Charles Darwin's (1872/1965) assertion regarding the association between facial expressions and emotions, researchers have investigated universalities in the recognition of facial expressions (Ekman, 1971; Ekman & Friesen, 1971; Ekman, Friesen, & Ellsworth, 1972; Izard, 1971, 1994).

However, people's attention to emotions is subject to substantial cultural variations (Ko, Lee, Yoon, Kwon, & Mather, 2011; Masuda, Wang, Ishii, & Ito, 2012; Matsumoto, Kwang, & Yamada, 2010; Miyamoto, Yoshikawa, & Kitayama, 2011; Stanley, Zhang, Fung, & Isaacowitz, 2013). For example, Miyamoto et al. (2011) demonstrated that holistic thinkers apply a configural-oriented mode of attention (e.g., viewing the face as a whole, and being sensitive to the relationship among facial parts), and analytic thinkers apply a feature-oriented mode of attention (e.g., attending to each facial feature).

These cultural differences also affect how people view individuals' emotions. Masuda and colleagues used face lineups to examine the emotion context sensitivity of European Americans and Japanese (Masuda, Akase, et al., 2008; Masuda, Wang, Ishii, et al., 2012) and measured participants' judgment patterns as a cognition. The center person was surrounded by four figures who showed an emotion that was either the same as or different from that of the center person, and participants were asked to judge the intensity of the center person's emotion. This research found that Japanese were more likely than European Americans to take the background people's emotions into account and adjust their ratings of the center person's emotions accordingly. The participants' eye-movement patterns were also consistent with this cultural difference in social attention, with Japanese paying more attention to background faces. Interestingly, Asian Canadians' and Asian international students' eye-movement patterns fell between those of European Canadians (who focused their attention exclusively on the center figure) and Japanese (who significantly allocated their attention to the background figures as well). These results support the idea that cultural differences in thinking styles also affect how people perceive social scenes. That is, those from more interdependent cultures tend to see a

target person's emotions as embedded in the social context, and those from more independent cultures tend to regard people as free from social context.

Culture also affects early attention to, and classification of, this emotional content, as seen through ERP methods (Fong et al., 2014; Russell, Masuda, Hioki, & Singhal, 2015). For example, Russell et al. (2015) investigated ERP patterns when European Canadians and Japanese viewed the previously described face lineups created by Masuda and colleagues (Masuda, Ellsworth, et al., 2008; Masuda, Wang, Ishii, et al., 2012). They targeted the ERP components known as N400 and late positive complex (LPC), which are related to early processing of semantic incongruities; stronger N400s and LPCs occur when information is considered incongruent. These stronger N400 and LPC patterns might be expected for lineups with differing emotions between the center and background faces when such differences are considered problematic to people's worldviews (i.e., if people are worried about social harmony), and we expected this pattern for holistic cultures. Consistent with this prediction, the results indicated that only Japanese showed strong N400s and LPCs to differences (rather than similarities) between central and background emotions (vs. similar emotions), suggesting that holistic modes of attention also lead to additional early neural processing of emotional incongruence.

In terms of the lifespan development of these patterns, Masuda, Nand, et al. (2017) recently examined Canadian and Japanese school-age children's emotion judgment styles. The results indicated that children's judgment and narrative styles were similar across cultures up to age 9. However, 10-year-old children started to show signs of change toward culturally unique modes of attention: Compared to those of their North American counterparts, Japanese children's judgment and narrative patterns indicated more attention to background people's emotions.

Researchers have also examined whether context effects on recognition of facial expressions are observable even within North American cultural contexts (Carroll & Russell, 1996; Fazio, 2001; Russell, 1991; Russell & Fehr, 1987). For example, in order to test which information participants take into account when they judge the target's emotional experiences, Carroll and Russell (1996) presented North American participants with incongruent information, such as the target person's facial expressions (e.g., anger) accompanied by situational information (e.g., the person encountered a bear during hiking). The results indicated that even North Americans put more weight on the situational information than the person's facial expressions (e.g., the person felt fear rather than anger).

However, Ito and his colleagues (Ito, Masuda, & Hioki, 2012; Ito, Masuda, & Li, 2013) speculated that social orientation would play an important role in people's culturally specific beliefs (Varnum, Grossmann, Kitayama, & Nisbett, 2010): People who hold an independent social orientation, which emphasizes a self-contained model of self, would think that all of one's emotional experiences come from inside of oneself, and would pay little attention to the background figures. In contrast, people who hold an interdependent social orientation, which emphasizes the effect of forces external to the target agent, would think it would be prudent to take into account the background figures' emotion when judging the target figure's emotion. We also speculated that, while the context effect does indeed exist across cultures, Americans would constrain themselves from taking the background figures' emotion into account, because the background figures' internal states are independent from that of the target agent. Therefore, we predicted that among North Americans, the effect of context sensitivity would be attenuated, especially when the context information is agentic (e.g., other individuals near the target person), but the context effect would still remain when the context information is not agentic (e.g.,

positive or negative scenery). Ito and his colleagues also predicted that, since Japanese are in general context sensitive, and since the notion of the independency of emotional states is not strongly shared, it is natural for Japanese to incorporate not only scenery but also background figures' emotions into the judgment of the target agent.

Using a paradigm similar to that of Masuda, Wang, Ishii, et al. (2012), Ito and his colleagues (Ito et al., 2012, 2013) created experimental stimuli in which the center figure's facial expression was presented against a salient background that was either nonagentic (e.g., a beautiful beach or a burned-out building) or agentic (e.g., two background figures who both showed happy or sad facial expressions). The results indicated that when the contextual information was nonagentic, European Canadians' judgment of the center figure's emotion was affected, whereas when the contextual information was agentic, their judgment was not affected by such information. However, the judgment of Japanese participants was affected by both nonagentic and agentic contextual information.

The findings suggest that even when the contextual information is salient, North Americans selectively include or exclude the information in their judgment in accordance with their lay belief about human emotional experiences. Future research can advance this line of studies by accumulating more scientific evidence and articulating when the contextual effects become intensified or attenuated, and to what extent such effects are observable among different cultural groups.

1.3 | Culture and aesthetics

Since Shweder (1991) asserted that the aim of cultural psychologists was to elucidate the mutual constitutions of culture and human psychology, researchers have extensively demonstrated how culture influences perception. However, they have only recently started to

examine how people in a given community create visual representations that reflect the culture's dominant meaning system. Such visual representations are often called “cultural products,” a tangible, public representation of culture such as mass media, textbooks, and advertisements (Morling & Lamoureaux, 2008). In this section, we discuss how holistic versus analytic thinkers create cultural products, especially visual representations such as fine arts, photography, web pages, and scientific reports.

One key factor in differentiating holistic from analytic information processing is how much information is considered optimal (Choi, Dalal, Kim-Prieto, & Park, 2003; Li, Masuda, & Russell, 2015). For example, Choi et al. (2003) found that when judging hypothetical murder cases, the more holistic Koreans took into consideration a greater amount of information than did European Americans or Asian Americans. It therefore seems reasonable to expect that when creating a visual representation, North Americans would be good at differentiating the main theme from peripheral, background information, and accentuating the salience of the main theme in the visual space, whereas East Asians would be good at holistically incorporating background and contextual information into the main theme while blurring the boundaries between them.

Several studies give credence to this assumption (Huang & Park, 2013; Masuda, Gonzalez, Kwan, & Nisbett, 2008; Nand, Masuda, Senzaki, & Ishii, 2014; Senzaki, Miyamoto, et al., 2014). For example, Masuda, Gonzalez, et al. (2008) asserted that throughout history, fine arts techniques are strongly influenced by culturally dominant messages. In East Asian cultures, where holistic thought is dominant, scenery painters have employed various ways of emphasizing field information such as a panoramic view of mountain chains and a bird's eye perspective, which allow viewers to capture entire scenes and attend to foreground information

and background information equally (French, 1978; Gombrich, 1995; Paine & Soper, 1955). To implement this technique, close objects such as people and objects directly in front of the viewer are drawn in the bottom of the frame, and far objects such as mountains are drawn at the top, resulting in scenic images rich in contextual information and with the horizon high in the frame. Portrait painters in these cultures also reflect the holistic thought process, by embedding the model in rich context.

In Western cultures, where analytic thought is dominant, scenery painters use a technique called linear perspective. This technique, which was developed during the Renaissance, forces viewers to see the image from a fixed point, allowing them to perceive an illusion of three-dimensional images, where the foreground information becomes significantly more salient than the background information (Berque, 1986; Giedion, 1964; Kubovy, 1986). Close objects and people directly in front of the viewer are drawn larger, and far objects such as mountains, forests, and fishermen's boats are drawn smaller, resulting in scenic images with relatively little context information and with the horizon lower in the frame. Likewise, portraits in Western cultures feature highly salient models against less salient backgrounds.

To test this observation empirically, Masuda, Gonzalez, et al. (2008) analyzed electronic visual data from East Asian and American museums in order to examine the visual art styles regarded as masterpieces in the respective cultures. As expected, the results indicated that relative to Western art, in East Asian art, the horizon in scenic images is higher, and models in portraits are smaller. Nand et al. (2014) further analyzed drawing style trends between the 16th and 20th centuries by examining electronic images from multiple museums in Europe, North America, and Japan. They found that although Japanese and Western scenic drawing styles

strongly influenced one another during certain periods (e.g., the late 19th century), at the end of the 20th century, the culturally dominant drawing styles still prevailed.

Do contemporary members of each culture still sustain culturally dominant aesthetic styles? Masuda, Gonzalez, et al. (2008) explored this possibility by asking undergraduate students from different cultural backgrounds to produce landscape drawings and portrait photographs. The results indicated that compared to their North American counterparts, East Asian international students (1) drew the horizon higher and included richer contextual information and (2) took portrait photos with the models appearing much smaller relative to the frame size. Developmental data further support this finding: European Canadian and Japanese children and teenagers (Grades 1 through 12) gradually developed expressions unique to their respective cultures. That is, Japanese children and teenagers were more likely than their Canadian counterparts to place the horizon higher in the visual space and to include more pieces of information (Nand et al., 2014; Senzaki, Masuda, Nand, et al., 2014).

Such tendencies are also evident in other behaviors and preferences (Wang, Masuda, Ito, & Rashid, 2012). For example, East Asian researchers tended to produce more information-rich conference posters than their North American counterparts did, and East Asian governmental and university portal pages contained more words and links than North American ones did. East Asian international students were generally better than North American students at detecting target images on complex web pages and considered information-rich web pages to be functionally and aesthetically preferable. These findings suggest that there are systematic cultural variations in the optimality of the amount of information, which correspond to culturally shared beliefs.

Researchers now acknowledge that exposure to culturally dominant information seems to shape one's aesthetic preferences (Miyamoto, Nisbett, & Masuda, 2006; Ueda & Komiya, 2012). For example, Ueda and Komiya (2012) demonstrated that participants primed with Japanese scenes were more likely to move their eyes within a broader area and were less likely to fixate on central objects, whereas there were no significant differences in the eye movements of participants primed with American scenes. These results suggest that culturally specific patterns in eye movements are partly caused by the physical environment. Further research is needed to examine to what extent experiences influence people's visual perceptual patterns.

2 | Toward new directions in research on culture and attention

The founders of cultural psychology acknowledged the importance of the mutual constitution of culture and the human mind (e.g., Miller, 1999; Shweder, 1991), and researchers have demonstrated empirically that culture is an indispensable factor in psychology. Resonating with the tenets of New Look psychology (Bruner, 1957; Bruner & Goodman, 1947), which emphasizes the importance of the top-down processes on perception, such evidence serves as a strong argument against the universalists' idea that psychological processes are independent of external influences (Fodor, 2008; Pinker, 1994, 1997, 2007; Pylyshyn, 1999; Tooby & Cosmides, 1992).

Recently, cultural psychologists have further advanced research on culture and psychology in multiple ways. For example, Varnum and Grossmann (in press), in their discussion of how historical changes in ecology influence psychological processes, addressed the dynamic transmission processes between culture and human psychology. Na et al. (2010) discussed the importance of differentiating cultural-level phenomena from individual-level phenomena and suggested that researchers should further elucidate subcomponents of holistic

versus analytic cognition. Furthermore, beyond the contrast of holistic versus analytic modes of attention, several researchers have investigated other dimensions of culture that could influence modes of attention, such as positive versus negative valence of information (Grossmann, Ellsworth, & Hong, 2012).

These issues addressed in the above studies are applicable to research on culture and attention. In addition, there are other issues that are specifically important only for research on culture and attention. In this section, building on the foregoing discussion of research on culture and attention, I will discuss four major strands of research that can be regarded as important candidates to further advance our understanding of culture and human mind: (1) research on culture → human psychological processes; (2) research on human psychology → cultural processes; (3) research on cultural neuroscience; and (4) research on cultural transmission processes (see Figure 1).

2.1 | Research on culture → human psychological processes

In order to test cultural psychologists' assumptions about the mutual constitution of culture and human mind, researchers have begun to examine the extent to which meaning systems shape basic cognitive and perceptual processes (culture → human psychology). In this paper, I have discussed how holistic versus analytic thought influences patterns of attention (e.g., Masuda, Russell, et al., 2017). However, researchers have now examined this issue by referring to many other factors, including social orientation (Markus & Kitayama, 1991, 2010; Varnum et al., 2010), economic and subsistence traditions (Uskul, Kitayama, & Nisbett, 2008), religious beliefs (Cohen & Rozin, 2001), and perceptions of honor (Nisbett & Cohen, 1996), as well as political discourses (Putnam, Leonardi, & Nanetti, 1993), discourses of social norms (Gelfand, Nishii, & Raver, 2006), residential or relational mobility (Oishi, 2010; Oishi, Schug, Yuki, &

Axt, 2015), ideas of voluntary settlement (Kitayama, Ishii, Imada, Takemura, & Ramaswamy, 2006), and social class (Grossmann & Varnum, 2011; Stephens, Markus, & Townsend, 2007). Future research is needed to further scrutinize (1) which meaning systems lead to what modes of attention and (2) how these different types of meaning systems mutually or independently influence modes of attention. Multilevel analyses, while identifying distal (e.g., historical and structural) and proximal (e.g., habitual and conventional) effects on psychological processes, will contribute to important breakthroughs in understanding human cognition (e.g., Miyamoto, 2013).

Current Directions in Research on Culture and Attention

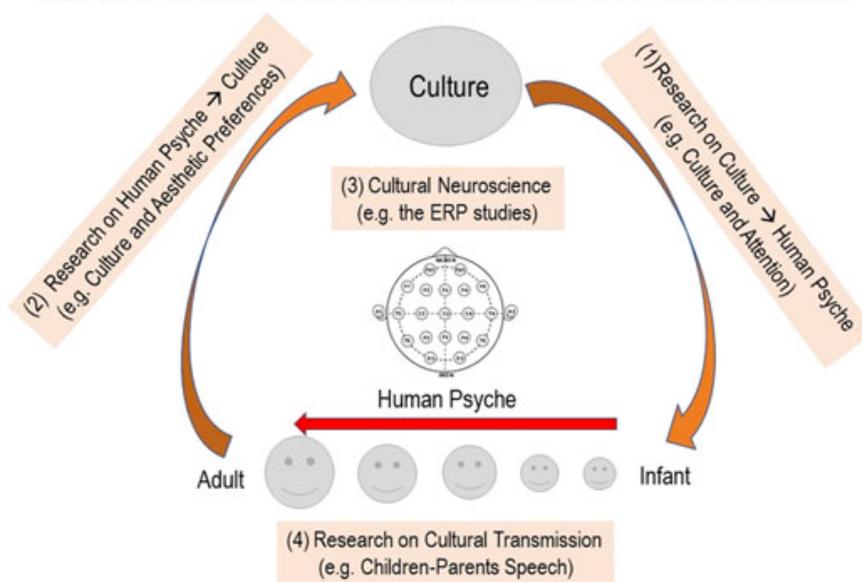


FIGURE 1 Current four directions in research on culture and attention. (1) Research on “culture → human psychological processes,” where we investigate how culture influences modes of attention; (2) research on “human psychology → cultural processes,” where we investigate how those who hold a specific mode of attention create cultural products and tangible representations of culturally shared meanings; (3) research on cultural neuroscience, where we investigate underlying mechanisms and processes of specific modes of attention; and (4) research on cultural transmission processes, where we investigate how specific modes of attention is taught by adults and internalized by children. ERP, event-related potential

2.2 | Research on human psychology → cultural processes

Research on cultural processes has not been comprehensively examined. Under the rubric of “cultural products” (Morling & Lamoureaux, 2008), researchers have begun to investigate cultural variations in human-made cultural resources that convey dominant cultural messages. Such resources include media reports, social networking sites, newspaper articles, children's stories, magazine advertisements, picture books, textbooks, and music lyrics (e.g., Huang &

Park, 2013; Imada, 2012; Imada & Yussen, 2012; Kim & Markus, 1999; Markus, Uchida, Omoregie, Townsend, & Kitayama, 2006; Masuda, Gonzalez, et al., 2008; Masuda, Wang, Ito, & Senzaki, 2012; Nand et al., 2014; Snibbe & Markus, 2005; Tsai, Louie, Chen, & Uchida, 2007; Wang et al., 2012). So far, research on cultural products has focused on archival data, and researchers have analyzed these data qualitatively and quantitatively using coding schemes and investigated the association between cultural products and cultural messages. To further advance this strand of research within the study of culture and attention, a feedback loop of human psychology → culture → human psychology should also be investigated. For example, researchers have demonstrated that long periods of exposure to culturally dominant patterns of information (e.g., scenic images) facilitate participants' cognitive and perceptual styles consistent with culturally shared messages (Miyamoto et al., 2006; Ueda & Komiya, 2012). Another line of studies has shown that participants find culturally dominant patterns of information aesthetically and functionally attractive (e.g., Wang et al., 2012) and are disposed to provide positive feedback to those who create cultural products consistent with dominant cultural values (Ishii, Miyamoto, Rule, & Toriyama, 2014).

As such, we maintain that the most pressing questions in this line of research would be detailed analyses in terms of (1) how cultural products are spread, transmitted, seen positively, and accepted by a given culture and (2) to what extent such popular cultural products convey culturally dominant messages.

2.3 | Research on cultural transmission processes

In addition to research on “the human psychology → culture → human psychology loop” among young adults, cultural psychologists are now starting to examine *when* in the course of children's development culturally unique patterns of attention become salient. The findings

suggest that when children engage in rudimentary cognitive and perceptual tasks, some cultural variations in modes of attention can be seen by ages 3–6 (Chiu, 1972; Duffy, Toriyama, Itakura, & Kitayama, 2009; Kuwabara & Smith, 2012, 2016; Kuwabara, Son, & Smith, 2011). However, when the tasks involve advanced-level cognitive abilities that require memory, judgment, and verbal descriptions, the effect of culture is only weakly observable at age 6 (Ishii, Rule, & Toriyama, 2017), gradually emerging around age 8–9 (Imada et al., 2013; Masuda, Nand, et al., 2017; Senzaki et al., 2016). Finally, when the cognitive tasks involve advanced reasoning skills such as social inference and causal explanation, cultural variations in attention are observable only after age 10 (Ji, 2008; Miller, 1984).

We speculate that children's social interaction becomes more advanced and their social cognition more developed around 9 or 10 years of age. For example, children at that age would create more complex social networks with peers, understand the social hierarchy, and become more attentive to how their behaviors are seen and evaluated by others. We maintain that such development is key to children's recognition of dominant social norms shared by people in their culture. Such sensitivity to social norms would also facilitate their further internalization of culturally dominant (normatively acceptable) modes of psychological processes, including the mode of attention.

Under the rubrics of scaffolding processes (Wood et al., 1976), guided participation (Rogoff, 2003), zone of proximal development (Cole, 1996; Greenfield & Bruner, 1969; Luria, 1976; Vygotsky, 1930/1978), joint attention (Tomasello, 1999), and cultural transmission (Mesoudi, 2011; Richerson & Boyd, 2005), cultural psychologists have also examined how parental guidance directly influences children's patterns of attention during tasks (Fernald & Morikawa, 1993; Ishii, Miyamoto, Rule, & Toriyama, 2014; Lee et al., 2017; Senzaki et al.,

2016). These studies demonstrated that caregivers directed their children's attention in culturally dominant ways: North American mothers tended to direct infants to attend to focal objects, whereas Japanese mothers tended to direct infants to attend to the relationships between focal and background objects. These studies have potential to elucidate the underlying mechanisms of cultural transmission processes related to attention.

For example, we speculate that, as children become more sensitive to social norms, they might be able to model their caregivers' mode of attention more carefully, and by internalizing it, they could make judgments, construct narratives, and remember information consistent with a given culture's dominant thinking style. To test this possibility, future research may design experiments to measure children's pattern of attention before, during, and after having a joint session with their caregivers, teachers, peers, or elder siblings, and then analyze to what extent the children's patterns of attention changed after the joint session, as well as what aspect of their responses (e.g., narrative style, judgment style, or type of information memorized) is influenced by such changes. Future research is needed to further elucidate such underlying mechanisms of cultural transmission processes related to attention.

2.4 | Research on cultural neuroscience

In addition to research on culture → human psychological processes that emphasize the importance of cultural influences on patterns of behavior, recent advances in cultural neuroscience further elucidate how deeply cultural factors influence brain functioning (e.g., Chiao, 2009; Han et al., 2013; Kitayama & Tompson, 2010; Kitayama & Uskul, 2011). Recent evidence in neuroscience indeed demonstrates that the human brain is malleably influenced by experiences and by the mastering of skills (Maguire et al., 2000; Scholz, Klein, Behrens, & Johansen-Berg, 2009).

Thanks to advances in technology such as fMRI, ERP, and functional near-infrared spectroscopy (fNIRS) methodology, this new research field has provided cultural psychologists with useful tools to demonstrate that culture affects our neural patterns. For example, cultural neuroscientists have used ERP methods to investigate cultural variations in various early attention processes, and their findings correspond to those of behavioral research (e.g., Goto et al., 2010; Ishii, Kobayashi, & Kitayama, 2010; Kitayama & Murata, 2013; Kitayama & Park, 2014; Lewis, Goto, & Kong, 2008; Masuda et al., 2014; Na & Kitayama, 2011; Russell et al., 2015; Varnum, Na, Murata, & Kitayama, 2012). With fMRI methods, researchers have investigated how holistic versus analytic thinkers process foreground versus background information (e.g., Goh et al., 2007; Gutchess, Welsh, Boduroglu, & Park, 2006; Hedden, Ketay, Aron, Markus, & Gabrieli, 2008). Similarly, fNIRS methods have shown that Asian Americans have increased activation in the parietal regions during a task that requires an analytic mode of attention, whereas European Americans showed increased activation in the same regions during a task requiring a holistic mode of attention, suggesting that extra attentional control was needed when the nature of the task did not align with the participants' dominant attention patterns (Murata, Park, Kovelman, Xiaosu, & Kitayama, 2015). As such, cultural neuroscience is a wonderful tool for enabling attention researchers to better understand the mechanisms underlying cultural differences in modes of attention.

There are many implications in cultural neuroscience. For example, while many findings indicate cultural differences in neural responses (e.g., Russell et al., 2015), some findings indicate that only neural responses are culturally variant, while behavioral patterns are similar across cultures (e.g., Hedden et al., 2008). That is, according to these findings, only neural data have the potential to further identify substantial cultural variations in psychological mechanisms,

and without such data, researchers could be blind to the substantial differences in mechanisms due to superficial similarities in behavioral data. Furthermore, some recent findings suggest that the majority of behavioral data obtained using a battery of cognitive tasks do not correlate with participants' self-reports on values (e.g., individualism vs. collectivism) or social orientation (e.g., independent vs. interdependent social orientation). However, there is substantial evidence that neural responses fairly associate with these cultural variables (e.g., Masuda et al., 2014; Russell et al., 2015). These findings suggest that only neural data may be directly associated with one's values and beliefs represented at the conscious level, as well as the potential mechanism behind the relationship. In other words, behavioral data might entail many confounding and uncontrollable factors that could obscure the association between one's conscious preferences, values, and beliefs, and one's psychological mechanism (Kitayama & Uskul, 2011; Masuda, Russell, et al., 2017). Furthermore, there is great potential for cultural neuroscience to allow researchers to elucidate individual differences that mediate cultural beliefs, and to examine how such differences clarify the relationship between behavioral and neural patterns (e.g., Goto et al., 2010; Hedden et al., 2008; Ishii et al., 2010; Na & Kitayama, 2011; Russell et al., 2015). None of these possibilities have been comprehensively tested. Therefore, we believe that cultural neuroscience would be a powerful tool for enabling a better understanding of the attention processes involved in cultural differences.

3 | Conclusion

Research on culture and attention has provided abundant evidence that there are substantial cultural variations between people's mode of attention. This paper overviewed both past and recent empirical findings and maintains that five new research directions will further advance research on culture and attention.

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