MOTHER–INFANT EMOTIONAL COMMUNICATION AND INFANTS' DEVELOPMENT OF EMOTIONAL EXPRESSIONS: A CROSS-CULTURAL STUDY IN THE UNITED STATES AND SOUTH KOREA

By

Alicia Yun Kwon

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Human Development and Family Studies - Doctor of Philosophy

2019

ABSTRACT

MOTHER–INFANT EMOTIONAL COMMUNICATION AND INFANTS' DEVELOPMENT OF EMOTIONAL EXPRESSIONS: A CROSS-CULTURAL STUDY IN THE UNITED STATES AND SOUTH KOREA

By

Alicia Yun Kwon

A caregiver is the primary environment of children during their early life, and the bidirectional process of emotional communication between caregivers and infants influences infants' emotional development. When infants express their emotions within the bidirectional interaction between caregivers and infants, the infants' emotional expression serves a communicative function. During this bidirectional interaction, the caregivers respond to the infants' emotional cues as well as initiate behaviors that encourage the infants' positive emotional responses to enhance their emotional communication. Furthermore, these caregiving behaviors are influenced by culture as caregivers internalize their cultural values, which, in turn, affect the infants' development of emotional expressions and lead to cultural differences in the infants' emotional development.

This dissertation aimed to identify and compare the relationship between parenting behaviors (responsiveness to infants' emotional cues and encouragement of infants' positive emotional responses) and infants' emotional expressions in the United States and South Korea. The first study focused on a cultural comparison of maternal responsiveness as an infant-elicited aspect of emotional communication and its relationship with infants' emotional expressions. This study revealed that Korean mothers are more responsive than U.S. mothers. When infants' intensities of positive and negative emotional expressions were compared, U.S. infants showed more intense expressions than Korean infants for positive emotions, while Korean infants showed more intense expressions than U.S. infants for negative emotions. Furthermore, culture

was found to have a moderating effect on the relationship between maternal responsiveness and infants' intensity of emotional expression: In the U.S. sample, mothers being more responsive were associated with infants expressing positive emotion more intensely whereas in the Korean sample, more responsive mothers were related with infants expressing positive emotion less intensely.

The second study focused on the mother-generated aspect of emotional communication and explored the behavior mothers initiate to elicit and heighten infants' positive emotions. In this study, these behaviors were called *emotion-arousing behaviors*. Specific emotion-arousing behaviors in both the United States and South Korea were identified. When mothers' emotion-arousing behaviors in each culture were compared in terms of the duration of these behaviors, Korean mothers showed emotion-arousing behaviors more than U.S. mothers. In addition, cultural-specific relationships between the mothers' emotion-arousing behaviors and the infants' positive emotional expressions were found.

The findings of this dissertation advance our understanding of the reciprocal effects mothers and infants have on each other and the influence of culture on the bi-directional relationship between parenting behaviors and infants' emotional expressions.

Dedicated to
My parents for their endless love and sacrifice,
My advisor, Dr. Claire Vallotton, for her constant guidance and support,
My brother, sister-in-law, and nephew for always rooting for me
And my husband, Sangyub Kim and my son, Sean Joon Kim, for being a source of motivation and encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1. INTRODUCTION

Introduction

Children's initial experiences with caregivers have an extensive influence on their later development, as they build an important bond with said caregivers through emotional communication. The bidirectional process of emotional communication between children and caregivers changes the emotions experienced through the ways in which they respond to each other's behavior (Tronick, 1989). In early infancy, children's expressions of emotions are informative cues for caregivers about their internal states and needs (Sullivan & Lewis, 2003), and these expressions elicit caregivers' responses (Bell, 1968), which influence children's consequent emotional development. In addition, children's emotional development can be influenced by caregivers' emotional behaviors, as said behaviors have a modeling effect on children and reinforce them to express certain emotions (Denham, Bassett, & Wyatt, 2007). Sameroff (1975) proposed a *transactional model* to describe children's developmental outcomes, which are explained by the characteristics of both caregiver and child. He argued that child outcomes cannot be predicted by simply assessing aspects of children or the caretaking environment alone. Children and caregivers simultaneously affect each other in a continuous way as patterns of interaction become ingrained or ritualized, and these patterns shape adult and child behavior and affect child development.

In addition to the influences occurring within proximal dyadic interactions, caregiver–child interactions are shaped by external environmental influences (Bronfenbrenner, 1979). One aspect of the environment that affects these interactions is culture. Culture is known to be an important factor that impacts on parental emotion socialization (Dunsmore & Halberstadt, 2009; Kitzmann & Howard, 2011). Holodynski (2013) suggested a sociocultural internalization model,

which is an integrative model of the development of emotional expression in infancy and childhood. According to this model, caregivers interpret and respond to infants' expressive behaviors within their cultural contexts and shape infants to link those expressions to emotions, which later influence infants' own expression of emotion. Thus, when an infant expresses their emotion spontaneously (e.g., an infant exhibits sadness through crying), this becomes a signal for others, who interpret the expression and respond to this meaningfully within their cultural context (e.g., the father comforts the infant). Then, the infant is able to intentionally use their emotional expression with others as culturally constructed signs (e.g., the infant starts to cry when they try to gain their father's comfort). In the following section, a basic framework that explains the influence of culture on parental emotion socialization is specified.

Cultural Model Explaining The Differences in Emotion Socialization between Western and Non-Western Cultures

Keller and Otto (2009) demonstrated two environmental prototypes that explain cultural models in order to understand the socialization of emotion regulation during infancy in diverse cultural contexts. According to the authors, there are cultural models demonstrating two eco-social environments that affect parents' emotion-related socialization strategies, and these result in the development of infants' emotion regulation (Keller & Otto, 2009). While the cultural model of independence represents the culture that highlights autonomy, where individuals develop an autonomous conception of the self, the cultural model of interdependence represents the culture that emphasizes relatedness, where individuals develop a relational conception of the self (Keller, 2010).

Given that the relative importance of autonomy and relatedness as socialization goals vary according to their eco-social contexts, Keller and Otto (2009) compared mothers'

socialization goals in two different cultures: German and Nso. As expected, German mothers had autonomous socialization goals (e.g., be assertive, be different from others, express own preferences clearly, develop personal talents and interests), while Nso mothers had relational socialization goals (e.g., respect elderly persons, do what parents say, maintain social harmony, share with others). In addition, the authors questioned the mothers' expectations in relation to their infants' expression of particular emotions and discovered that German mothers generally expected infants to express each emotion earlier on in their development. Interestingly, the German mothers made some exceptions for shame and guilt, which are considered self-referential emotions that regulate social relationships. The authors also revealed that Nso mothers valued infants being calm, while German mothers expected infants to be emotionally expressive. The findings highlight different emotion-related socialization goals that are based on the relevant cultural contexts, thus showing cultural contexts to be powerful factors that influence infants' development of emotional expression.

Cultural differences in maternal socialization goals of independence versus interdependence can be revealed through parenting behaviors during mother–infant interactions. For example, when the contingency patterns of German/Nso mother–infant interactions were compared, culture-specific differences emerged in infants aged two months, and these culturally different contingency patterns seemed to reflect different socialization goals (Kärtner, Keller, & Yovsi, 2010). According to Kärtner and colleagues (2010), German mother–infant dyads showed more visual contingencies and fewer proximal contingencies than Nso mother–infant dyads, and this result was linked to the finding that German mothers provided more face-to-face interactions than Nso mothers. Based on the evidence that face-to-face interaction, which is a feature of distal parenting, encourages infants to develop their autonomy (Keller, Kärtner, Borke, Yovsi, & Kleis,

2005; Keller et al., 2004), it was suggested that German mothers' more prevalent use of distal parenting behaviors (e.g., visual contingencies) is a result of their attempt to pursue autonomous socialization goals. Further, Kärtner and colleagues (2010) emphasized the awareness of bidirectional process during mother–infant interactions and interpreted their findings of cultural differences in the duration of infants' gaze toward mothers as cultural differences in mother–infant mutual gaze bolstered by mothers, which reflects the maternal socialization goal of autonomy.

Although the cultural models of independence and interdependence are useful to explain the cultural differences in parental socialization behaviors, it is noteworthy that Keller (2010) suggested the existence of multiple combinations of these models. For example, these multiple combinations exist among urban middle-class families in Eastern societies, where people from relational cultures adapt to autonomous cultures. Korean culture falls into this category, since Korean culture has its basis in Confucianism, which fits within the interdependent cultural model. However, at the same time, there has been a rapid change in cultural values as South Korean society becomes increasingly modernized and Westernized. In fact, previous research that investigated parents' socialization goals from 1989 to 2010 has shown that East Asian parents do not necessarily have collectivist socialization goals (e.g., interdependence) and that obedience was not a common socialization goal in East Asian or Western cultures (Park, Coello, & Lau, 2014). Thus, while the concepts of independence and interdependence can be used as overarching principles, it is important to consider the coexistence of two cultural models in one culture as well as variations in the relative importance of two cultural values based on the relevant developmental periods and contexts (Tamis-LeMonda et al., 2008).

Cross-Cultural Studies on Infants' Development of Positive Emotions

Positive emotions play an important role in infancy, as their regulation generates and maintains infants' positive interactions and relationships with caregivers (Simons, McCluskey-Fawcett, & Papini, 1986). While positive emotions during infancy are universal across cultures, infants' development in terms of the expression and regulation of these positive emotions, as well as the parental socialization of positive emotions, may vary by culture, specifically in respect of emotion expressivity or arousal level. Previous studies have shown that individuals from Western and Eastern cultures valued high-arousal positive emotions, such as excitement, and low-arousal positive emotions, such as calmness, differently (Park, Tsai, Chim, Blevins, & Knutson, 2016; Tsai, Knutson, & Fung, 2006**)**. This finding implies that parents from diverse cultures may have different socialization goals related to positive emotions, and as a result, infants' development of positive emotion expression can vary depending on their cultural background. However, compared to studies that have focused on infants' negative emotions (Friedlmeier & Trommsdorff, 1999; Mizuta, Zahn-Waxler, Cole, & Hiruma, 1996), relatively few studies have focused on the cultural variations in infants' expression or regulation of positive emotions, and the parental socialization of positive emotions (Kärtner, Holodynski, & Wörmann, 2013; Wörmann, Holodynski, Kärtner, & Keller, 2012). Considering the role that positive emotions play during infancy, further research on the cultural differences in infants' emotional expression of positive emotions as well as parental socialization behaviors related to positive emotions will extend our understanding of infants' development.

Current Dissertation

Given the bidirectional nature of mother–infant interactions, the influence of parenting behaviors (stemming from cultural socialization goals) on infants' development seems to be complex. In this sense, focusing on cultural differences in parenting behaviors which reflect the bidirectional feature, broadens our perspective by providing a dynamic view of how culture influences mothers' emotion socialization behavior through the bidirectional effects that mothers and infants have on each other. In this vein, the current dissertation investigates the influence of two parenting behaviors, which reflect bidirectional aspects of emotional communication (see Figure 1), on infants' expression of positive and negative emotions in two cultures: the United States and South Korea. Based on the theory of the impact of culture on emotion socialization (Holodynski, 2013), I expect that culture influences mothers' emotion socialization behavior and that this in turn leads to cultural differences in infants' development of emotional expression (see Figure 1). Focusing on maternal responsiveness to infants' emotional cues as a parenting behavior that infants elicit, the first study (Chapter 2) aims to investigate the potential cultural differences in maternal responsiveness and examine the effect of these differences on infants' development of emotional expression across cultures. Focusing on mothers' behavior that encourages infants' emotional responses as a form of mother-generated behavior, the second study (Chapter 3) aims to explore specific behaviors that evidence mothers' encouragement of positive emotional responses, determine the cultural differences in these behaviors, and explore whether there is a relationship between mothers' encouragement of positive emotional responses and infants' development of emotional expression. Finally, the overall discussion, which includes integrated interpretations of the findings from the two studies, is described in Chapter 4.

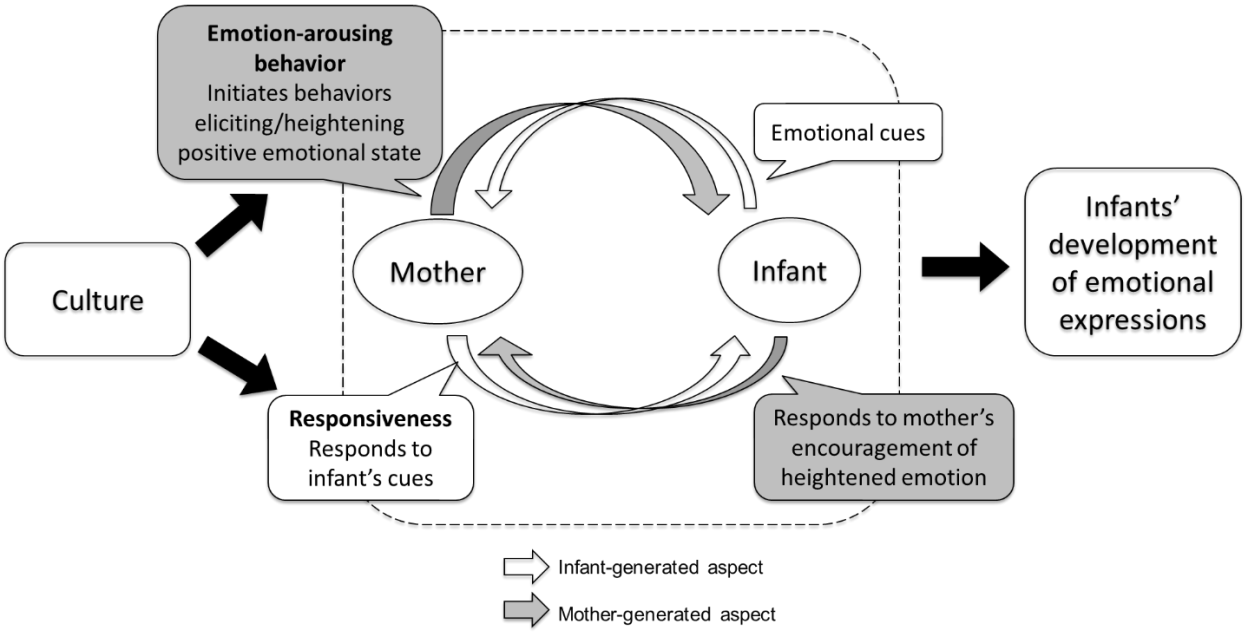

Figure 1. Theoretical model for understanding cultural socialization of emotion

CHAPTER 2. CROSS-CULTURAL DIVERSITY IN MATERNAL RESPONSIVENESS AND ITS RELATIONSHIP WITH INFANTS' EMOTIONAL EXPRESSION: A COMPARISON OF U.S. AND KOREAN MOTHER–INFANT DYADS

Literature Review

Caregivers' emotion socialization processes play an important role in infants' emotional development. Further, socialization processes operate within the contexts of cultural systems: Caregivers' parenting beliefs or socialization goals are based on their cultural values and influence their emotion socialization behaviors. Holodynski (2013) explained, through a sociocultural internalization model, how caregivers' responses to infants' expressive behavior shape infants' emotional expression within their cultural contexts. As maternal sensitivity has been highlighted as a major form of emotion socialization behavior during infancy, this study aims to investigate maternal sensitivity from a cross-cultural perspective and find a culturally specific path to infants' development of emotional expression.

The concept of sensitivity is sometimes used interchangeably with responsiveness. However, sensitivity *includes* responsiveness in its construct, as it is defined broadly as a mother's appropriate, prompt, and accurate responses to her child that are reciprocal, warm, and contingent upon the child's behavior (Shin, Park, Ryu, & Seomun, 2008). Considering the important role that culture plays in caregivers' socialization processes, caregivers' sensitivity or responsiveness has been compared across cultures (Chan, Penner, Mah, & Johnston, 2010; Friedlmeier & Trommsdorff, 1998, 1999; Trommsdorff & Friedlmeier, 1993, 2010). However, those studies showed mixed results due to the use of different terms and operational definitions. Thus, in the current study, I use the term maternal "responsiveness" and define it as mothers' contingent and prompt responses to infants' cues in order to reduce confusion in terminology. I

focus on the specific aspects of sensitivity, prompt response and contingent response, because these aspects relate to different emotion socialization goals in Western (independent) and Eastern (interdependent) culture. Moreover, these are the aspects that can be measured micro-analytically, which is the way to be measured without coders' culturally biased decisions. Since none of the previous cross-cultural studies have examined maternal responsiveness in this way, the current study is expected to contribute meaningfully to previous findings.

Caregivers' Responsiveness and Infants' Emotional Expression

When infants express their emotions within bidirectional interactions with their caregivers, the former's emotional expressions serve a communicative function. Young infants who have not yet fully developed their verbal language communicate with others in nonverbal ways using their face, body, and vocalizations (Tronick, 1989). Sullivan and Lewis (2003) pointed out that young infants' nonverbal expressions provide cues about their states and needs and are thus considered channels of communication. Gianino and Tronick (1988) found that infants' emotional expression involves powerful communicative signals that regulate parent–infant interactions and suggested that accuracy in reading each other's signals influences reciprocity.

Since infants' emotional expression in caregiver–infant interactions hold information about their states and desires, caregivers' ability to recognize and understand infants' cues during these interactions are central to maintaining and improving the quality of the interaction (Sullivan & Lewis, 2003). Responsive caregivers can help infants fulfill their needs by accurately detecting and then interpreting infants' expressive cues. Thus, in this study, caregivers' responsiveness is defined as caregivers' ability to recognize infants' cues and provide prompt and contingent responses. The focus of this study is on how maternal responsiveness to a

variety of emotional cues within infant–mother interactions affects the development of infants' emotional expression.

The extant literature on caregivers' responsiveness examined its association with infants' expression of negative and positive emotions. The relationship between caregivers' responsiveness and infants' expression of negative emotions has been shown to be negative. In attachment research, it was revealed that infants of minimally and inconsistently available caregivers, who typically show lower levels of responsiveness, had difficulty regulating their negative emotional expression and also heightened the intensity of said expression (Cassidy, 1994). This finding specifically referred to infants who were classified as having an insecure/resistant attachment style. In the case of infants classified as having insecure/avoidant attachment, it is known that infants minimize their emotions and barely display any overt emotional expression (Cassidy, 1994). However, there is evidence that insecure/avoidant infants who are subject to unresponsive parenting such as rejecting parenting also show higher-intensity of negative emotions in distressing situations (e.g., separation) compared to the subgroup of securely attached infants (Braungart & Stifter, 1991). This implies that caregivers' low levels of responsiveness may influence infants (both insecure/avoidant and insecure/ambivalent) to express their emotions more intensely. Further, a study that investigated infants' immediate reactions to caregivers' unresponsiveness found that when caregivers showed a lack of responsiveness to their cues during face-to-face interactions, infants showed more emotional reactions (Bell & Ainsworth, 1972; Tronick, Als, Adamson, Wise, & Brazelton, 1978). In Tronick and colleagues' (1978) study, when caregivers were not responsive to infants' cues, infants actively signaled with emotional displays to elicit optimal responses from their caregivers. In addition, Bell and Ainsworth (1972) discovered that when mothers were more

responsive to infants' crying, infants were less likely to cry. Therefore, in the present study, I focus on maternal responsiveness, especially maternal responsiveness to infants' emotional cues, as a parenting practice related to parental emotion socialization (Gondoli & Braungart-Rieker, 1998), which is expected to be closely related to the development of infants' emotional expression. I hypothesize that infants will develop less intense expressions of negative emotions if mothers are responsive to subtle emotional cues and respond quickly to infants' emotional cues, whereas infants' expressions will be more intense if their mothers respond less quickly and are less responsive to subtle emotional cues.

While previous studies have demonstrated negative relationships between caregivers' responsiveness and infants' expression of negative emotions, relatively little research on infants' positive emotions showed a positive relationship between caregivers' responsiveness and infants' emotional expression. Malatesta, Grigoryev, Lamb, Albin, and Culver (1986) demonstrated that infants' positive emotional expression becomes more intense as their mothers contingently respond to infants' expressions of interest. In addition, securely attached infants who probably had responsive parents showed more expressions of positive emotions (Diener, Mangelsdorf, McHale, & Frosch, 2002; Matas, Arend, & Sroufe, 1978; Waters, Wippman, & Sroufe, 1979) and displayed more joy during play compared to insecure infants (Kochanska, 2001). Thus, I pose a separate hypothesis for positive emotions and propose that infants will develop more intense expressions of positive emotions if their mothers are more responsive.

The Impact of Culture on the Emotional Communication between Caregiver and Infant

Although emotional experiences and expressions are assumed to be universal (e.g., Darwin 1872), it is important to view caregivers' socialization and infants' emotional development from a cross-cultural perspective (Friedlmeier, Corapci, & Cole, 2011; Halberstadt

& Lozada, 2011). In the following sections, I present the evidence to show that the emotion socialization of caregivers in different cultures leads to cultural differences in infants' emotional expression. Then, the findings of cross-cultural studies on caregivers' responsiveness and infants' emotional expression are reviewed. As the present study focuses on U.S. and Korean mothers and infants, the literature reviewed here includes cross-cultural studies on Western and Eastern populations.

The cultural socialization of emotional expression. Camras, Bakeman, Chen, Norris, and Cain's (2006) study highlights that caregivers' cultural backgrounds have an extensive impact on children's emotional expression. They investigated cultural differences in relation to parental factors (i.e., maternal self-reported expressiveness and parenting attitudes) with respect to children's expression of emotion. They compared Chinese adoptees, Chinese, Chinese Americans, and European Americans to examine whether differences in their emotional expressions were influenced by ethnicity and/or culturally based socialization. According to their study, European American children showed more expressivity than adopted Chinese children and Mainland Chinese children. Interestingly, adopted Chinese children showed higher expressivity than Mainland Chinese children, indicating that culturally based socialization may play a role in young children's expression of emotion. Further, the researchers found that maternal expressivity and parenting attitudes predicted children's expressivity. They concluded that rather than inherent ethnicity, social experience is important in influencing young children's expression of emotion.

In addition, other studies have found strong similarities between mothers' and infants' emotion expressivity and between the presentation of emotional categories and the specific facial features used when expressing these emotions (Malatesta et al., 1986; Malatesta & Haviland,

1982). Although these studies did not directly examine the effect of culture on socialization, they did show how emotional expression is part of the socialization process and based on the caregivers' displayed rules, which are closely related to the caregivers' cultural background (Ekman & Friesen, 1975). Thus, caregivers' emotion socialization appears to be an important element when attempting to understand the effect of culture on emotion communication.

Cultural differences in caregivers' responsiveness. There is broad agreement across cultures that caregivers' sensitivity is an important element of ideal parenting (Mesman et al., 2016). However, the way in which this sensitivity is expressed as a specific behavior varies depending on the cultural context (Mesman et al., 2018). Empirical studies have shown that cultural differences exist between Western and Eastern cultures in terms of caregivers' sensitivity. When a study was conducted to compare Japanese and German mothers, Japanese mothers were more sensitive to their infants in terms of warmth, responsiveness, empathy, and acceptance than German mothers (Friedlmeier & Trommsdorff, 1998, 1999). Similar findings were found in Trommsdorff and Friedlmeier's (1993, 2010) studies on mother–preschooler dyads: Japanese mothers were more sensitive (i.e., they responded promptly and were supportive) to their children than German mothers. The authors' findings imply that Japanese mothers may be more sensitively responsive because they understand others' feelings and desires, based on subtle communication, and try to predict others' needs before they are expressed (Doi, 1973), since their culture values interdependence and relatedness (Dennis, Talih, Cole, Zahn-Waxler, & Mizuta, 2007; Rothbaum & Trommsdorff, 2007; Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000). The elements used to measure maternal responsiveness in the above studies were the promptness and contingency of mothers' responses. These aspects of sensitive responsiveness seem to be expressed differently in Western and Eastern cultures.

Chan and colleagues (2010) also found cross-cultural differences in maternal responsiveness between East Asian immigrants and Euro-Canadian. However, according to their study, East Asian immigrant mothers were less responsive than Euro-Canadian mothers, thus showing findings that are different to other studies. The discrepancy between these studies seems to be due to the different operational definitions of responsiveness used in their coding systems. The responsiveness in Chan and colleagues' (2010) study was rated differently and regarded a low level of responsiveness as intrusiveness. Responsiveness in their study referred to the mothers' ability to adapt her response appropriately to her child's abilities, needs, requests, and interests, and the coding system they used in this study described mothers who were low in responsiveness as "intrusive and operated according to their own goals." (Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002, p.80). However, intrusiveness can be viewed as an excessively prompt response, depending on the coders' cultural values, that contributes to high responsiveness if the focused aspect of responsiveness is promptness. Therefore, having a clear operational definition of responsiveness and measuring aspects of responsiveness according to its definition is extremely important in cross-cultural studies.

Thus, focusing on more objective aspects of responsiveness by using micro-analytical coding will help us to better understand how maternal responsiveness explicitly manifests itself in diverse cultures. Maternal responsiveness has been measured by observation using a rating scale (Chan et al., 2010; Friedlmeier & Trommsdorff , 1998, 1999; Karl, 1995; Lewis, 1993; Trommsdorff & Friedlmeier, 1993, 2010) and self-reports (Amankwaa, Pickler, & Boonmee, 2007). However, using observational measures in cross-cultural research requires cross-cultural validity (Chan et al., 2010), and this especially is the case when observational measures use macro-codes, such as a global rating system, since the concept is implicitly linked to the

observed behaviors (Bell & Bell, 1989). Further, a ceiling effect, which occurs when a high proportion of subjects in a study have maximum scores on a rating scale, can mask the actual differences in responsiveness, as Friedlmeier and Trommsdorff (1999) stated in relation to their results. Thus, the present study attempted to measure the components of maternal responsiveness in a micro-analytical way by coding them moment by moment.

In the current study, I focused on two subtypes of responsiveness—namely, responsiveness to obvious cues versus responsiveness to subtle cues—as well as two aspects of responsiveness—namely, contingency continuum (i.e., the percentage of infants' cues that were responded to by mothers) and promptness of response (i.e., the interval between the infants' cues and the mothers' responses). These two subtypes and aspects of responsiveness are noteworthy in cross-cultural comparisons, since evidence of the relatively high responsiveness of Asian caregivers is reflected in Rothbaum, Negaoka, and Ponte's (2006) findings. According to Rothbaum and colleagues' (2006) study, American preschool caregivers were more likely to consider sensitivity as being responsive to children's explicit expressions of need (i.e., responsive sensitivity), while Japanese preschool caregivers were more likely to consider sensitivity as being responsive to more subtle and nonverbal cues and anticipating needs before they are expressed (i.e., proactive sensitivity). Similar patterns were found when German and Korean mothers were compared (Ziehm, Trommsdorff, Heikamp, & Park, 2013), although Korean mothers' preferences for responsive vs. proactive sensitivity varied by situation (Park, Trommsdorff, & Lee, 2012). It seems that caregivers' different sensitivity preferences (i.e., proactive or responsive) were affected by their socialization goals, which are based on their cultural values. Ziehm and colleagues (2013) discussed that German and Korean mothers who chose to respond in a proactively sensitive way in given situations gave different reasons for

doing so. For example, when they were asked how they would respond to an upset child, German mothers chose to respond proactively in order to encourage the child's emotional expression, whereas Korean mothers' aimed to distract the child from their negative emotions and cheer them up.

Given these results, proactively responsive mothers will try to respond quickly so that they can fulfill their infants' needs *before* they are expressed. In order to do this, they need to focus on every possible cue, including subtle and nonverbal ones, to anticipate their infants' desire. In this sense, keeping in mind that proactive sensitivity is more related to interdependent cultures, the difference in responsiveness between Western and Eastern cultures may be prominent if responsiveness is explored as two subtypes that are based on whether mothers are responsive to obvious or subtle cues. In the current study, obvious cues are defined as infants' actions that include vocalization or physical touch while subtle cues are defined as facial cues that do not accompany vocalization or physical touch. In sum, the results of previous studies on responsiveness across cultures varied and depended on which components of responsiveness were measured. Considering cultural differences in the preference of two forms of sensitivity, focusing on responsiveness as a prompt and on contingent responses to obvious and subtle cues will lead to valuable contributions. Therefore, in this study, Korean mothers are hypothesized to show higher levels of responsiveness than U.S. mothers by responding to infants' cues quickly as well as responding to more subtle cues.

Cultural differences in infants' emotional expression. Even though adults' emotional expression has been widely studied across cultures (Drummond & Quah, 2001; Matsumoto, 1993; Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002; Tsai & Levenson, 1997), relatively few cross-cultural studies have been conducted on infants' emotional expression.

Moreover, these studies have shown inconsistent results, depending on how the emotions were measured and which emotions/aspects of emotions were measured. The sequence of studies by Camras and colleagues (1997, 1998) identified cultural diversity in infants' expression of emotion. According to Camras and colleagues' (1998) study, which focused on infants' facial expressions, the highest levels of expressivity were shown by American infants, followed by Japanese infants, and then Chinese infants for both positive (smiling) and negative (crying) emotions. Further, Camras and colleagues (1997) compared American, Japanese, and Chinese infants and found that happy emotions were rated higher in American infants than Asian (i.e., Japanese and Chinese) infants in a surprise-eliciting condition (the vanishing object procedure). Similarly, American infants' distress was rated higher than Asian infants' distress in a frustrating/anger-eliciting condition (arm restraint procedure). However, in the surprise-eliciting condition, negative emotions such as distress, frustration, and fear were rated higher for Asian infants than American infants. Since their study used observers' ratings of how much the infant experienced the emotion in three emotion-eliciting conditions based on non-facial cues, the rating scores of each emotion reflected a feature of relative intensity. Therefore, the higher rating indicates a higher prevalence and/or higher intensity of each emotion. Their study points out that cultural patterns of higher expressivity in American infants in comparison to Asian infants are not necessarily shown across procedures conducted to elicit different emotions. This implies that cultural patterns related to prevalence or intensity of emotions are not consistent across various emotions.

Cultural differences were also revealed in the different types of emotion evoked by a given situation. Camras and colleagues (1997) examined whether the target emotion in each condition was predominantly expressed by comparing the relative proportion of emotions

expressed within each condition. While two procedures targeting frustration/anger and fear (growling gorilla procedure) were effective for all three cultures, the procedure targeting surprise was only valid for American infants. This implies that despite using the same task, the probability of the appearance of the target emotion elicited by the task can differ across cultures.

Some studies have highlighted the importance of a dynamic view of emotional expression. When non-facial behavior was considered, Japanese infants performed more head movements, gazing, and mouth actions than American infants to express surprise (Camras et al., 1998). In addition, Chinese infants did not perform a surprised expression, such as body stilling, in the surprise-eliciting condition, whereas American and Japanese infants did (Camras et al., 2002). Camras and colleagues (2002) discussed how Chinese infants' expressions may have been expressed by more subtle surprise-related behaviors, which may not be perceived or interpreted by Western observers. They suggested that including non-facial features of emotional expression would be necessary in future studies. Therefore, noting the importance of bodily cues in expressing and perceiving emotions shown in adults (Aviezer, Trope, & Todorov, 2012), corporeal features as well as facial features are included in this study to examine cultural differences in the intensity of emotional expression.

Culture as a moderator in the relationship between maternal responsiveness/sensitivity and infants' emotional development. Culture not only contributes to differences in maternal responsiveness and infants' emotional expression—it may also influence how maternal responsiveness influences infants' emotional expression. Previous studies have found that maternal responsiveness/sensitivity have culture-specific effects on children's emotional development. Friedlmeier and Trommsdorff (1999) found that low maternal sensitivity was associated with toddlers' negative regulation of negative emotions for the

German dyads, while the high sensitivity of Japanese mothers was related to toddlers using negative rather than positive regulation. The culture-specific effects that appeared in their study were attributed to the ceiling effect of Japanese mothers' sensitivity. In Trommsdorff and Friedlmeier's (2010) study, culture differentiated the way in which maternal sensitivity led to changes in infants' distress levels. Sensitive German mothers were paired with children who maintained their distress levels during the task, whereas the children of sensitive Japanese mothers showed decreased distress levels. The authors interpreted this result in the following way: Sensitive mothers in both cultures intended to promote the cultural appropriateness of children's distressed emotions, but differences arose in terms of how the appropriateness of distressed expression was attained, this attainment being based on their cultural values. Lastly, Chan and colleagues (2010) found that parenting responsiveness was negatively associated with child behavioral problems for Euro-Canadians but positively associated for East Asian immigrants due to differences between measurement validity in each culture. Although the culture-specific effect of responsiveness is derived from different sources in these studies, they underline the possible role of culture as a moderator. Therefore, I also examine if culture has a moderating effect on the relationship between maternal responsiveness and infants' emotional expression in the current study. While few studies have focused on the culture-specific effect of maternal responsiveness on expression of negative emotion, no study, to the best of my knowledge, has explored expression of positive emotions that are linked to maternal responsiveness in a cross-cultural context. For this reason, no specific hypothesis is formed in this study, and the study aims to address this research gap by testing how culture moderates the effect of maternal responsiveness on both positive and negative emotional expression.

Research Questions and Hypotheses

This study aims to investigate the cross-cultural variations between U.S. and Korean mothers and infants in terms of their maternal responsiveness to infants' emotional cues and emotional expression. For my first research question, I ask whether there are any cultural differences in the maternal responsiveness of U.S. and Korean mothers. Since I focus on two aspects of responsiveness, two different responsiveness variables are examined: a) whether mothers respond to infants' subtle cues and b) how quickly they respond to infants' cues. I hypothesize that Korean mothers are more responsive than U.S. mothers in terms of both aspects of responsiveness (i.e., Korean mothers will respond to more subtle cues, and they will respond more quickly to infants' cues, than U.S. mothers). For my second research question, I ask whether there are any cultural differences in infants' emotional expression. Infants' pleasure and discomfort expression will be analyzed separately. In addition, the expression of each emotion will be explored by a) determining whether infants express each emotion and b) measuring the intensity of emotional expression, including both facial and corporeal features. I hypothesize that more U.S. infants than Korean infants express pleasure and discomfort. In addition, it is hypothesized that U.S. infants show a higher intensity of emotional expression than Korean infants.

The present study also aims to determine whether there is any relationship between maternal responsiveness and infants' emotional expression. Related to this aim, I first ask whether there are differences in maternal responsiveness between infants who express the emotions (pleasure/discomfort) and those who do not express these emotions. I hypothesize that the responsiveness of mothers whose infants express these emotions will be lower. Second, I ask whether maternal responsiveness predicts the intensity of infants' emotional expression. I

hypothesize that higher levels of maternal responsiveness lead to a lower intensity of emotional expression. However, I will also explore if culture and maternal responsiveness have an interaction effect on infants' emotional expression.

Methods

Participants

The U.S. sample used in the present study was part of the Cross-Cultural Development of the Expression of Emotion (CCEE) study, which is a longitudinal research project aimed at examining young children's development of expression, labeling, and comprehension of emotions in Chile and the United States. Seventy-two U.S. families (infants and their primary caregivers) participated in the CCEE study. The present study utilizes video recordings and other data from the first wave of the CCEE study (when infants' age was between 10 and 14 months) to form a sub-sample of the participants. In the present study, a number of participants were excluded, including infants who participated with their fathers, those who were from families of low socio-economic status (SES), and those who did not use English as their first language. These exclusions were made in order to increase equivalency with the Korean sample. Additionally, the videos that did not accurately capture the facial expressions of mothers and infants throughout the mother–infant free play were excluded, since one of the main variables of the current study is measured using mothers' and infants' facial expressions during free play.

For the present study, the U.S. participants included 34 infants (17 girls) and their mothers, all of whom lived in the Midwest. The infants' age ranged from 10 to 14 months (M = 11.50, SD = 1.26), and the mothers' age ranged from 21 to 41 years (M = 31.94, SD = 4.41).Twenty-seven mothers were European American (79.4%), 4 mothers were African

American (11.8%), and one mother was Arabic (2.9%). There were two mothers who did not identify their ethnicity. Sixteen mothers had started or completed a graduate degree (47.1%), 14 mothers had completed a bachelor's degree (41.2%), 2 mothers had completed an associate degree (5.9%), and 2 mothers had completed high school (5.9%). Twenty infants were from families of high SES, based on the parents' educational level and occupation (58.8%), and 14 infants were from middle SES families (41.2%).

In relation to the Korean participants, 30 Korean infants (16 girls) and their mothers took part. The Korean participants lived in Seoul, Gyeongi-do, or Gyeonsangbuk-do Province. The infants' age ranged from 10 to 14 months (M = 12.17, SD = 1.44), and the mothers' age ranged from 27 to 38 years (M = 32.50, SD = 3.18). There was no ethnic diversity in the Korean sample. Fourteen mothers had started or completed a graduate degree (46.7%), 9 mothers had completed a bachelor's degree (30.0%), 3 mothers had completed an associate degree (10.0%), and 4 mothers had completed high school (13.3%). Nineteen infants were from families of high SES (63.3%), and 10 infants were from middle SES families (33.3%). One mother chose not to identify her family's SES level.

Two sample *t*-tests were conducted to test any differences between the U.S. and Korean samples in terms of the infants' age, mothers' age, mothers' education level, and SES (see Table 1). There were no significant differences in these variables.

Table 1.
Demographic Information for U.S. and Korean Samples for Study 1

	U.S.	Korean	
	M(SD)	*M(SD)*	*t*
Infant age	11.50 (1.26)	12.17 (1.44)	-1.97
Mother age	31.94 (4.41)	32.50 (3.18)	-0.57
Mother education			0.82
High school	2 (5.9%)	4 (13.3%)	
Associate degree	2 (5.9%)	3 (10.0%)	
Bachelor degree	14 (41.2%)	9 (30.0%)	
Graduate degree	16 (47.1%)	14 (46.7%)	
SES			-0.54
Medium	14 (41.2%)	10 (33.3%)	
High	20 (58.8%)	19 (63.3%)	

Note. *M* = Mean; *SD* = Standardized deviation.

Procedures

The U.S. mothers were recruited through a childcare center that their infants attended. The members of the research team visited each childcare center in the morning or afternoon when the caregivers dropped off or picked up their child. Caregivers who had a child younger than 14 months were then contacted by the research team in person or on site. Korean mothers were recruited through online communities that provide childcare information and resources. The U.S. and Korean mothers who showed interest in the study provided their contact information and were contacted by the research coordinator when their child's age was between 10 and 14 months.

Research visits with infants and their mothers were conducted in the childcare centers (18 U.S. families) or in the family home (16 U.S. families and all Korean families). At the beginning of the visit, the mothers provided informed consent. The mothers and infants were invited to play on a blanket on the floor in a room where age-appropriate toys (i.e., a doll with a bottle, a blanket, a car, a puzzle, a teddy bear, blocks, a rattle, and a book with images) were

provided. The researcher told the mother to play as normal with her child. The mother–infant free play lasted five minutes. Then, four challenging tasks from the Gesture Assessment in Children (Farkas & Vallotton, 2012) were given to the infants in the presence of their mothers. The mother–infant play and challenging tasks were video recorded. In addition, the mothers completed a questionnaire on their demographic information and another questionnaire about their infant's temperament. At the end of the visit, the infants received a book while the mothers received a gift card.

Measures

Maternal responsiveness to infants' emotional cues. The mothers' responsiveness to their infants' emotional cues was measured by coding the mother–infant free play. A specific coding system was developed for the purpose of this study.

Coding. To measure mothers' responsiveness to infants' emotional cues, three coding schemes were developed. The first coding scheme is infants' affect. For every event of an affect change, the coders coded the infants' affect (highly negative, negative, neutral, positive, highly positive) based on their facial expressions. In addition, every event of infants' vocalization was coded. The second coding scheme is infants' interest behavior. Infants' behavior that sought eye contact from their mothers as well as instances of touching their mothers were coded as infants' interest behavior. The subtleness of the infants' cues was decided based on whether their emotional cues included vocalization or touching. I assumed the cues accompanying vocalization to be more obvious than those that did not accompany vocalization. Similarly, the cues that included touching the mother (i.e., behavior directed toward mothers) would be more obvious. Therefore, emotional cues accompanying either vocalization or touching are considered *obvious* cues, and emotional cues without these components are considered *subtle* cues. The last coding

scheme is mothers' behaviors. Once infants' emotional cues are coded, a window of five seconds after the onset of each cue was used to code the mothers' behaviors as responses to infants' cues. Then, the onset of mothers' behaviors (e.g., eye contact with infants, touching, gesturing, adjusting body position to facilitate interaction, comment on/question infants' emotional cues) occurred during each five-second window was coded. Any responses that were not based on the infants' cues or were harsh in tone were considered inappropriate and were not included. Latency from the onset of an infant's cue to their mother's response and the percentage of infants' obvious and subtle cues that elicited their mother's response were used as variables for the analysis. Mothers who responded more quickly to their infant's cues and responded to infants' more cues were considered as more responsive mothers. Percent of agreement was used to calculate inter-coder reliability, and it ranged from 86% to 94% for infants' cues and from 73% to 90% for mothers' behaviors.

Intensity of infants' emotional expression. To assess infants' emotional expression, four tasks from the Gesture Assessment in Children (Farkas & Vallotton, 2012) were given to the infants. Two tasks were designed to induce the infant to express positive emotions, such as happiness, pleasure, or satisfaction (success tasks). As well as this, two tasks were designed to elicit infants' negative emotions, such as frustration, irritation, or dissatisfaction (frustration tasks).

Success tasks. For the first task, the mothers were told to help their infants put three blocks in a bucket. For the second task, the mothers were asked to build a tower with five blocks and invite their infant to knock it down. The mothers were asked to help their infants in completing the tasks, and they were told to encourage their infants during the task and congratulate them following the completion of each task.

Frustration tasks. For the first frustration task, the researcher put mittens that did not have a separate space for thumbs on the infant and demonstrated banging a drum with small drumsticks. Then, the researcher put the drumsticks on the floor near the infant and encouraged the infant to play the drum or pick up the drumsticks. The last task involved asking the infant to take off the mittens. During the frustration tasks, mothers were requested not to give their infant any help, although they could encourage their infant to complete the task by talking to them.

Coding. Throughout the four tasks, including the two success tasks and the two frustration tasks, only the most intense expressions of pleasure and discomfort were selected. Using a window of two seconds before and after the most intense expressions (a window of four seconds in total), the coders coded the involvement of each feature of the face (e.g., forehead, eyebrows, eyes, mouth) and body (e.g., head, torso, arms/hands, legs) as either involved (1) or not involved (0) in the expression of the emotion. The score for intensity of emotional expression was obtained by adding the number of facial features and body parts involved in the expression. In other words, intense emotional expression indicated that infants used more facial features and body parts to express their pleasure or discomfort. Percent of agreement was used to calculate inter-coder reliability, and it ranged from 89% to 100%.

Results

Preliminary Analysis

The descriptive statistics (mean and standard deviations) of the study variables are presented in Table 2. A correlation analysis using Pearson's correlation coefficient was conducted to examine the relationship between the study variables (see Table 3). A correlation analysis was run separately for the U.S. and Korean samples. In the U.S. sample, the percentage

Table 2.
Descriptive Statistics of Variables for Study 1

Variables	*M(SD)*
Maternal responsiveness	
Latency (sec) from onset of infants' obvious cue to mothers' response	0.97 (0.43)
Latency (sec) from onset of infants' subtle cue to mothers' response	0.59 (0.34)
Percent of infant's obvious cues which mother responded to	0.82 (0.19)
Percent of infant's subtle cues which mother responded to	0.86 (0.21)
Infants' intensity of emotional expression	
Number of face and body parts used for pleasure expression	5.18 (1.93)
Number of face parts used for pleasure expression	2.68 (1.00)
Number of body parts used for pleasure expression	2.49 (1.24)
Number of face and body parts used for discomfort expression	6.65 (1.55)
Number of face parts used for discomfort expression	3.45 (0.78)
Number of body parts used for discomfort expression	3.20 (1.24)

Note. *M* = Mean; *SD* = Standardized deviation.
89.1% of infants expressed pleasure while 62.5% of infants expressed discomfort

of the infants' obvious cues that the mothers responded to was positively related with the number of face parts infants used for pleasure expression (r = .38, p <.05). Also, the number of facial features that the infants used for pleasure expression was positively related with the number of facial features the infants used for discomfort expression (r = .60, p <.05). In the Korean sample, there was a negative relationship between the latency from the onset of the infants' subtle cue to the mothers' response and the percentage of the infants' subtle cues that the mothers responded to (r = -.47, p <.05). In addition, the number of facial features the infants used for pleasure expression was positively related with the number of body parts the infants used for pleasure

expression (r = .49, p <.05). Similarly, the number of facial features the infants used for discomfort expression was positively related with the number of body parts the infants used for discomfort expression (r = .48, p <.05).

Table 3.
Bivariate Pearson Correlation among Variables for Study 1

	1	2	3	4	5	6	7	8
1	-	.22	-.10	-.13	-.00	-.07	.10	-.14
2	.04	-	-.23	-.08	.09	-.03	.37	-.32
3	-.21	.06	-	.22	.38*	.31	.04	.39
4	.02	-.47*	.02	-	.07	.17	-.12	.23
5	.32	-.14	-.26	.33	-	.23	.60*	-.11
6	.14	.25	-.21	-.01	.49*	-	-.30	.46
7	-.07	-.04	-.08	.10	.10	.03	-	-.17
8	-.13	.27	-.08	-.06	-.05	.37	.48*	-

* $p < .05$

Note. 1= Latency from onset of infants' obvious cue to mothers' response; 2= Latency from onset of infants' subtle cue to mothers' response; 3=Percent of infant's obvious cues which mother responded to; 4=Percent of infant's subtle cues which mother responded to; 5=Number of face parts used for pleasure expression; 6=Number of body parts used for pleasure expression; 7=Number of face parts used for discomfort expression; 8=Number of body parts used for discomfort expression.
Correlation shown above diagonal is correlation for U.S. sample and correlation shown below diagonal is correlation for Korean sample.

Cultural Differences in Maternal Responsiveness

One-way analyses of variance (ANOVAs) were conducted to test the cultural differences in maternal responsiveness between U.S. and Korean mothers (see Table 4). As explained in the Methods section, two aspects of maternal responsiveness were used as variables for the analysis. In addition, each variable was divided into two sub-variables based on the type of infant cue (obvious or subtle). Levene's tests were conducted to assess the homogeneity of the variance. The percentage of infants' obvious cues that the mothers responded to and the percentage of infants' subtle cues that the mothers responded to were shown to have unequal variances. For

these variables, Welch's one-way ANOVAs were used, as this test is unaffected by unequal variances.

While the latency from the onset of infants' obvious cues to mothers' responses was significantly longer in the U.S. sample than the Korean [$F_{(1, 61)} = 5.66$, $p < .05$], and there was no significant cultural difference in the latency from the onset of infants' subtle cues to mothers' responses [$F_{(1, 61)} = 0.90$, *n.s*]. When the percentage of infants' cues that mothers responded to was analyzed, both sub-variables showed significant cultural differences [percentage of infant's obvious cues mother responded to: $F_{(1, 62)} = 29.90$, $p < .001$; percentage of infant's subtle cues mother responded to: $F_{(1, 62)} = 4.23$, $p < .05$].

Table 4.
Results of One-Way ANOVAs Comparing Responsiveness between U.S. and Korean Mothers

Variables	*M(SD)*		*F*
	US	Korea	
Latency (sec) from onset of infants' obvious cue to mothers' response	1.09 (0.35)	0.84 (0.47)	5.66*
Latency (sec) from onset of infants' subtle cue to mothers' response	0.56 (0.30)	0.64 (0.38)	0.90
Percent of infant's obvious cues which mother responded to	0.72 (0.18)	0.93 (0.11)	29.90***
Percent of infant's subtle cues which mother responded to	0.81 (0.24)	0.92 (0.16)	4.23*

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

Cultural Differences in Infants' Emotional Expression

The proportion of infants who expressed each emotion. First, to examine whether there was any cultural differences in the proportion of infants who expressed each emotion (pleasure and discomfort), a two-proportion *z*-test was used. In relation to pleasure, 33 out of 34 U.S. infants (97.1%) and 24 out of 30 Korean infants (80.0%) expressed pleasure. The difference was statistically significant ($z = 2.18$, $p < .05$). In relation to discomfort, 15 out of 34 U.S. infants

(44.1%) expressed discomfort, while 25 out of 30 Korean infants (83.3%) expressed discomfort, showing a significant difference (z = -3.23, $p < .01$).

Intensity of emotional expression. One-way ANOVAs were conducted to investigate the cultural differences in infants' intensity of emotional expression (see Table 5). Based on Levene's test, the facial intensity of the discomfort expression was found to have unequal variance. For this variable, Welch's ANOVA was conducted.

For the pleasure expression, U.S. infants' corporeal intensity was marginally higher than Korean infants' [$F_{(1, 55)} = 3.90$, $p < .10$]. There was no significant difference in infants' facial intensity for the pleasure expression [$F_{(1, 55)} = 0.02$, *n.s.*]. For the discomfort expression, Korean infants' intensity of facial expressions was higher than U.S. infants [$F_{(1, 38)} = 6.58$, $p < .05$], while no significant difference was found in infants' corporeal intensity [$F_{(1, 38)} = 0.00$, *n.s.*].

Table 5.
Results of One-Way ANOVAs Comparing Intensity of Emotional Expression between U.S. and Korean Infants

Variables	*M(SD)*		*F*
	US	Korea	
Pleasure expression			
Number of face parts used for pleasure expression	2.67 (1.05)	2.71 (0.96)	0.02
Number of body parts used for pleasure expression	2.79 (1.24)	2.08 (1.44)	3.90^{+}
Discomfort expression			
Number of face parts used for discomfort expression	3.07 (0.96)	3.68 (0.56)	6.58*
Number of body parts used for discomfort expression	3.20 (1.37)	3.20 (1.19)	0.00

$^{+}$ $p < .10$, * $p < .05$

Relationship between Maternal Responsiveness and Infants' Intensity of Emotional Expression

Multiple linear regression was conducted to test whether maternal responsiveness predicted infants' intensity of emotional expression while controlling for infants' age. None of the sub-variables of maternal responsiveness significantly predicted infants' intensity of emotional expression.

Moderating effect of culture on the relationship between maternal responsiveness and infants' intensity of emotional expression. A hierarchical regression analysis was conducted to examine the moderating effect of culture on the relationship between maternal responsiveness and infants' intensity of emotional expression. Maternal responsiveness and culture were centered. As seen in Table 6, a significant moderating effect was found on the relationship between the percentage of obvious cues that mothers responded to and the intensity of infants' pleasure expression. The result of a simple slope test showed that higher percentages of obvious cues that mothers responded to significantly predicted a higher intensity of pleasure expression for the U.S. sample ($b = 4.39$, $p < .05$), whereas a higher percentage of obvious cues that mothers responded to marginally predicted a lower intensity of pleasure expression for the Korean sample ($b = - 5.35$, $p < .10$). The simple slopes are plotted in Figure 2.

Table 6.
Results of Hierarchical Regression Analysis Testing a Moderating Effect of Culture on the Relationship between Maternal Responsiveness and Infants' Intensity of Emotional Expression

	Model 1	Model 2	Model 3
Infant age	-0.30	-0.21	-0.27
Culture		-0.91	-0.13
Percent of obvious cue mother responded to		1.91	-0.48
Culture × Percent of obvious cue mother responded to			-9.78*
R^2	.05	.08	.19
ΔR^2	-	.04	.11*

*$p < .05$
Note. Unstandardized beta coefficients are reported.

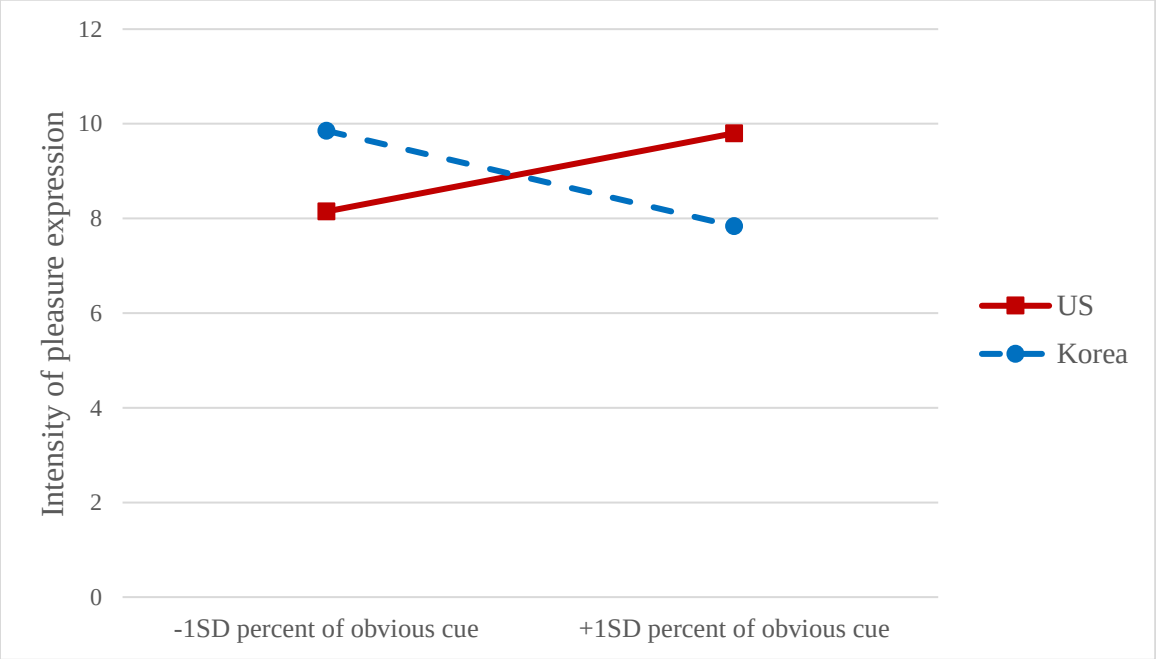

Figure 2. Simple slopes of maternal responsiveness (percent of obvious cue mother responded to) predicting infants' intensity of pleasure expression for U.S. and Korean samples

Post-Hoc Analyses

Several post-hoc analyses were conducted in order to better understand and interpret the above findings. First, cultural differences in the infants' negativity, one of the dimensions of temperament, was tested. Infants' negativity was measured using the Infant Behavior Questionnaire-Revised-Very Short Form **(**IBQ-R-VSF) (Putnam & Rothbart, 2006), which is completed by parents. The questionnaire consists of 37 items that describe infants' behavior, and parents are asked to select one of the eight choices: from "never (1)" to "always (7)", and "does not apply (NA)", depending on how often their infant exhibited the behavior in the past seven days. IBQ-R-VSF produces three dimensions of temperament: surgency/extraversion, negativity, and effortful control. Results of the ANOVAs that tested cultural differences in negativity showed no significant differences between U.S. and Korean infants' negativity. Infants' global expressiveness was also measured using the same tasks (the Gesture Assessment in Children) (Farkas & Vallotton, 2012). Throughout the tasks, infants' general emotional tone or mood was scored from 1 (predominantly negative) to 5 (predominantly positive). When the cultural differences were examined through an ANOVA, U.S. infants' global expressiveness was higher than that of Korean infants [$F_{(1, 62)} = 16.11$, $p < .001$].

Further, in order to explore whether a similar culture-specific relationship exists for negative emotion, differences in maternal responsiveness between infants who expressed discomfort and infants who did not express discomfort were tested in each culture. Results of the *t*-tests identified that similar patterns in the relationship between maternal responsiveness and positive emotions were found in the relationship between maternal responsiveness and discomfort expression: Mothers of infants who expressed discomfort were more responsive than mothers of infants who did not express discomfort in the U.S. sample ($t = -2.55$, $p < .05$) while

mothers of infants who expressed discomfort were less responsive than mothers of infants who did not express discomfort in the Korean sample ($t = 1.89$, $p < .10$).

Discussion

Based on a sociocultural internalization model (Holodynski, 2013), which highlights the role that culture plays in caregivers' emotion socialization, the current study investigated the differences between U.S. and South Korean mothers' maternal responsiveness to infants' emotional cues as well as infants' expressions of positive and negative emotions. Consistent with the hypothesis, higher responsiveness was found in Korean mothers when compared to U.S. mothers. In relation to the infants' emotional expression, cultural variations focused on the proportion of infants who expressed each emotion and the difference in the intensity of emotional expression. The proportion of infants who expressed positive emotions (pleasure) as well as the intensity of pleasure expression was higher in U.S. infants than Korean infants. Conversely, the Korean sample had a higher proportion of infants who expressed negative emotions (discomfort) than the U.S. sample, and infants' intensity of discomfort expression was higher in the Korean sample than in the U.S.

Further, when the relationship between maternal responsiveness and infants' emotional expression across cultures was examined, culture-specific effects of maternal responsiveness on infants' development of emotional expression were found. While high maternal responsiveness was associated with infants' high intensity of pleasure expression in the U.S. sample, high maternal responsiveness was linked to a low intensity of pleasure expression in the Korean sample.

Cultural Differences in Maternal Responsiveness

One of the findings of the present study was the cross-cultural differences in maternal responsiveness. Focusing on two aspects of maternal responsiveness—namely, response proportion (i.e., the number of infants' cues responded to by mothers / total infants' cues) and promptness of response. Korean mothers were more responsive than U.S. mothers: They responded to a higher percentage of infants' cues and also responded quicker to those cues. This result is consistent with previous studies, thus demonstrating that Eastern caregivers tend to be more responsive and sensitive to their infants compared to Western caregivers (Friedlmeier & Trommsdorff, 1998, 1999; Trommsdorff & Friedlmeier, 1993, 2010). Moreover, this finding supports and can be explained by the idea that Eastern caregivers tend to believe that sensitive caregivers can better predict infants' needs, even if those needs are not expressed clearly (i.e., proactive sensitivity), while Western caregivers tend to regard sensitive caregivers as those who respond to infants' cues once they have been expressed explicitly (i.e., responsive sensitivity) (Rothbaum et al., 2006). It appears that Korean mothers respond promptly to as many cues as they can in order to predict their infants' emotional needs and thus respond proactively to them. On the other hand, U.S. mothers may choose not to respond to the cues that are not explicit, and they do not respond as quickly as Korean mothers do to infants' cues. They do this in order to encourage infants' to communicate their needs more clearly. This is consistent with responsive sensitivity, as well as the socialization goal of encouraging children's autonomy (Keller & Otto, 2009).

Cultural Differences in Infants' Emotional Expression

Consistent with previous cross-cultural research on infants' emotional expression (Camras et al., 1997, 1998), more U.S. infants expressed positive emotions during the task than Korean infants, and their expression of positive emotions was more intense. These results add to the findings of previous studies, as the difference between U.S. and Korean infants was specifically found in their corporeal intensity of pleasure expression. This indicates that U.S. infants tend to express their pleasure through their body as well as their face, while Korean infants tend to express their pleasure only through their face. A number of studies have demonstrated more intense emotional expression in Western people than Asian people (Kleinsmith, De Silva, & Bianchi-Berthouze, 2006; Mauss & Butler, 2010; Soto, Levenson, & Ebling, 2005), and the U.S. infants' more intense expression of positive emotions may have been a result of modeling by their parents or other close adults. Although the modeling effect of mothers was not the focus of this study, further exploration of this matter is possible in the future, as our data include video recordings of mothers' intensity of emotional expression when they were asked to represent emotions.

Contrary to my hypothesis, the intensity of discomfort expression was higher in Korean infants than in U.S. infants. Specifically, a cultural difference was found in facial intensity but not in corporeal intensity. As a follow-up analysis, infants' temperaments were explored. There was no significant difference in negativity, a dimension of temperament relevant to the frequency and intensity of infants' negative emotional expression, as measured by the mothers' self-reports. However, when infants' general emotional tone during the task that I used to measure infants' intensity of emotional expression was measured, U.S. infants' global expressiveness of emotions tended to be more positive during the task, while Korean infants' emotions were generally

neutral. This implies that U.S. infants' positive tendencies throughout the task may have counterbalanced their expression of negative emotion. Nevertheless, since this finding is conflicting with my hypothesis as well as findings from previous studies (Camras et al., 1997), it needs to be interpreted carefully and should be investigated further in future studies.

Culture as a Moderator in the Relationship between Maternal Responsiveness and Infants' Emotional Expression

The current study confirmed a culturally specific path from maternal responsiveness to infants' intensity of emotional expression. A moderating effect was specifically found in the relationship between the percentage of obvious cues that mothers responded to and the intensity of infants' pleasure expression: As U.S. mothers were more responsive to infants' cues, infants showed higher intensity in their pleasure expression. On the other hand, Korean infants expressed pleasure less intensely if their mothers were more responsive to their cues. This indicates that U.S. mothers respond to infants' cues in ways that upregulate infants' positive emotion, whereas Korean mothers are responsive in ways that downregulate infants' positive emotion. This finding is supported by a previous study (Song, Yang, Doan, & Wang, 2019), where it was shown that Chinese immigrant mothers use more emotion-dampening reactions to their children's positive emotions than European American mothers do. Moreover, the culture-specific pattern found here seems to be related to the different emotion socialization goals of the two cultures. Previous research on the cultural values of positive emotions demonstrated that Western cultures value high-arousal positive emotions, such as excitement, while Eastern cultures value low-arousal positive emotions, such as calmness or contentment (Park et al., 2016; Tsai et al., 2006). Mothers in this study may have responded to their infants' emotional cues

depending on their cultural value of positive emotion, and this in turn affected their infants' intensity of pleasure expression.

Although a significant moderating effect of culture was shown in the relationship between maternal responsiveness and intensity of infants' positive emotional expression, it was not shown for infants' negative emotion. A similar pattern of a culture-specific relationship was found between maternal responsiveness and negative emotions in the post-hoc analysis. Based on this analysis, which compared the group of infants who expressed discomfort to the group of infants who did not express discomfort in each culture, mothers of infants who expressed discomfort were more responsive in the U.S. sample, while mothers of infants who did not express discomfort were more responsive in the Korean sample. Thus, it appears that U.S. mothers are responsive in the way of upregulating emotions, regardless of the valence of emotions. Similarly, Korean mothers seem to be responsive in the way of downregulating both positive and negative emotions.

Strengths, Limitations, and Future Directions

The sample of the current study included two cultural groups: U.S. and South Korean families. While these two cultural groups were equivalent regarding their ages, family SES, and maternal education level, the findings of this study may not be generalizable to mothers and infants from low SES families, as the samples did not include families of low SES. In addition, my study samples may not reflect the nature of whole populations of the United States and South Korea, since the samples were derived from specific regions of each country. Finally, although the sample size was adequate as a descriptive study, future studies with larger samples will be able to test more complex models, including moderation and mediation models.

Despite these limitations, the current study contributes to existing literature by filling a gap in cross-cultural research on parenting and suggests important points to consider for future studies. First, while previous cross-cultural research on emotion socialization has been heavily focused on negative emotion, the present study included infants' positive and negative emotion. Song and colleagues' (2019) recent study found that mothers' dampening reactions to children's positive emotions were only detrimental to European American children and not to Chinese immigrant children, thus highlighting that the same socialization behavior toward positive emotions can have different effects on children's developmental outcomes across cultures. Therefore, further cross-cultural studies on the parental socialization of positive emotions will be beneficial, as they will expand our knowledge on the values of positive emotions in different cultures and allow us to understand how those cultural values transmit to infants and children through socialization processes.

Another point that fills a gap in the literature is that maternal responsiveness was coded using a micro-analytic method rather than a macro-analytic method (e.g., a global rating system). Using micro-analytic coding is specifically meaningful for cross-cultural studies because it is less vulnerable to the issue of cultural validity and focuses more on describing than interpreting the behaviors of interest. Two aspects of responsiveness (i.e., promptness and proportion of responses) were effectively measured using a micro-analytic method. If a global rating system, which is commonly used in cross-cultural studies on maternal responsiveness, were used, promptness and proportion of maternal responses might have reflected coders' subjective interpretations due to their cultural bias. Nevertheless, in order to pick out mothers who highly show proactive sensitivity, coders themselves need to be highly sensitive while they observe

mother-infant interactions, therefore, coders' limited sensitivity may have under-estimated the cultural differences in maternal responsiveness.

Implications

The findings of the current study have important implications for parents and early educators. Parents from different cultural backgrounds should be aware that their own views on responsiveness may differ depending on their cultural backgrounds. Further, there is no right or wrong way for parents to show their responsiveness as long as there is coherence between their behaviors and their parenting goals. As well as this, since early educators take care of infants from various cultural backgrounds, considering the different cultural values of positive emotions will help them better understand infants' expression and regulation of positive emotion.

CHAPTER 3. EXPLORATION OF MOTHERS' EMOTION-AROUSING BEHAVIOR IN THE UNITED STATES AND SOUTH KOREA AND ITS RELATIONSHIP WITH INFANTS' EMOTIONAL EXPRESSION

Literature Review

Infants and mothers communicate emotions when they interact, and this interaction begins from the infant's early stages of infancy. During emotional communication, infants experience a specific kind of behavior that mothers initiate to encourage positive emotional responses from them. Mothers also repeat these behaviors to heighten infants' positive emotions once they are elicited. While these behaviors reflect unique features of mother–infant emotional communication that cannot be observed in emotional communication among adults, no study has focused on this group of behaviors. In the current study, I call these behaviors *emotion-arousing behaviors* and explore how mothers' emotion-arousing behaviors relates to infants' development of emotional expression.

Parental socialization of emotion is a common research topic due to the impact it has on infants' emotional development. Similar to other parenting behaviors, mothers' emotion-arousing behaviors can be considered one of the ways that mothers socialize emotions, specifically positive emotions. Given that parents' socialization goals reflect their cultural values (Keller & Otto, 2009), mothers will conduct emotion-arousing behaviors based on their own cultural values that are related to positive emotions. In this sense, the present study attempts to determine the potential role of emotion-arousing behaviors in transmitting cultural values of positive emotions by examining the cultural variations in them.

While the parental socialization of negative emotions was largely explored in previous research (Eisenberg & Fabes, 1994; Garside & Klimes-Dougan, 2002), relatively little attention

has been paid to the socialization of positive emotions. Moreover, the developmental period targeted in most studies that dealt with the socialization of positive emotions was adolescence. Consequently, little is known about the socialization of positive emotions in infancy, despite the importance of this early stage. Thus, this study of infants' positive emotions is expected to expand existing knowledge on the socialization of positive emotions.

Mothers' Encouragement of Positive Emotional Responses through Infant-Directed Expressions

A unique feature of communication between mothers and infants is that mothers use specific kinds of multimodal expressions that are attuned to the state of the infant (Brand, Baldwin, & Ashburn, 2002; Chong, Werker, Russell, & Carroll, 2003; Fernald & Simon, 1984; Stern, Spieker, & MacKain, 1982). These expressions differ from those used in adult communications. When interacting with infants, mothers tend to use rising and expanded pitch contour, exaggerated intonation, and prosodic repetition when they vocalize (Fernald & Simon, 1984; Grieser & Kuhl, 1988; Snow, 1972; Stern et al., 1982) and use exaggerated facial expressions such as "mock surprise" (eyebrows raised, eyes and mouth wide open) (Stern, 1974a), "fish face" (lips rounded and pursed with furrowed eyebrow and wrinkled forehead) (Stern, Beebe, Jaffe, & Bennett, 1977), and a special kind of smile (partially squinted eyes with an exaggerated but very warm smile) (Chong et al., 2003). These characteristics of mothers' infant-directed speech and facial expressions enable mothers to attain infants' attention (Fernald, 1985) and encourage infants to share positive emotions with mothers (Werker & McLeod, 1989). In addition, mothers' displays of infant-directed expressions make mother–infant communication more informative for infants compared to adult-directed expressions (Fernald, 1989). More specifically, it is effective in eliciting infants' positive affect (Fernald, 1993).

More recent studies revealed that, similar to infant-directed vocalizations and facial expressions, specific action features are used when mothers interact with infants. Mothers use more expansive motions with simple units of actions, are more likely to be physically close to infants, and use actions more repetitively with infants than with adults (Brand et al., 2002; Brand, Shallcross, Sabatos, & Massie, 2007). Previous studies have shown that infants prefer infant-directed action, *motionese* (Brand et al., 2002), to adult-directed action; that infants showed increased attention in response to motionese (Brand & Shallcross, 2008); and that repetition of movement, as one of the features of motionese, encouraged infants' object exploration (Koterba & Iverson, 2009). These studies suggest that highly social aspects exist in motionese, similar to infant-directed speech and facial expressions, and it helps infants to learn about the complex system of intentional movements.

Although previous literature revealed important common features of infant-directed speech, facial expressions, and actions, studies that consider infant-directed behavior as "multimodal motherese" (Gogate, Bahrick, & Watson, 2000) are rare. More specifically, few studies have explored mothers' infant-directed behaviors, functioning as multimodal motherese or motionese, that are likely to be observed in mothers' daily interactions with their infants. Moreover, some studies used experimental designs where the participants (i.e., the mothers) were asked to express or act in a certain way according to the experimental conditions. However, the behaviors observed in such designs may not reflect the natural frequency and range of these behaviors as they occur in actual mother–infant interactions. Thus, the present study attempts to identify mothers' behavior, which has the feature of multimodal motherese, occurring in the naturalistic context of free play.

Mothers' Emotion-Arousing Behavior and Infants' Emotional Expression

Infant-directed multimodal expressions seem to work in reciprocal emotional stimulations between mothers and infants. By modifying their face, voice, and body movements, mothers can maintain positive emotional communication with infants. For example, a mother's facial expression acts as a stimulus that amplifies the positive emotions of the infant during sustained mutual-gaze transactions. Then, infants signal their pleasure back to the mother. As this reciprocal stimulation occurs repeatedly, mother–infant dyads progress toward a symbiotic state of heightened positive affect (Beebe & Stern, 1977; Schore, 1994). However, this mirroring pattern between mothers and infants is not simply a case of one individual imitating the other. Rather, mothers communicate their delight and pleasure back to infants with escalated intensity (Schore, 1994; Stern, 1990). In natural mother–infant interactions, mothers initiate infant-directed behaviors, such as exaggerated gestures or high-pitched vocalizations, and exhibit these behaviors repeatedly based on their previous positive experience of the effective use of infant-directed behaviors. The focus of the current study is the range of maternal behaviors that serve this function of heightening infants' positive affect. I call these behaviors *emotion-arousing behaviors.* For the purposes of this study, emotion-arousing behavior is defined as a bout of repetitive, multimodal infant-directed expression that attempts to elicit and heighten infants' positive emotion.

Mother–infant games. Mother–infant games, which have many features of emotion-arousing behaviors, have been well-documented in several studies. Mother–infant games are defined as "a series of episodes of mutual attention in which the mother uses a repeating set of behaviors with only minor variations during each episode of mutual attention" (Stern, 1974b, pp. 414-415). This definition demonstrates the many qualities of emotion-arousing or infant-directed

behaviors that mother–infant games are comprised of. Further, mother–infant games have proven to be effective in engaging infants and eliciting their positive emotions (Markova, 2018). However, in order to be regarded as a form of emotion-arousing behavior, mother–infant games should accompany mothers' positive affect with exaggerated features or intensity-rising vocalizations and motions.

While there are various types of mother–infant games that can be considered emotion-arousing behaviors, *peek-a-boo* seems to be the representative example that is most common during infants' first year of life, as it contains the features of exaggerated excitement and repetitive patterns. According to Sroufe and Wunsch's (1972) study, peek-a-boo was the social game that elicited laughter effectively from infants aged between 10 and 12 months. Other games, such as *gonna get you* and *chasing, crawling after*, were also effective in eliciting infants' laughter (Sroufe & Wunsch, 1972). Since exploring and finding specific kinds of emotion-arousing behaviors is the primary aim of this study, only examples of mother–infant games are included here. To distinguish mother–infant games from the emotion-arousing behaviors studied here, mother–infant play can be considered a game but not an emotion-arousing behavior if there is no repetitive attempt to elicit positive emotions from infants. On the other hand, other exaggerated and repeated behaviors of mothers that serve to elicit positive emotions from infants, such as the exaggerated gasp, are considered emotion-arousing behaviors but are not described as mother–infant games.

Possible relationship between mothers' emotion-arousing behaviors and infants' emotional expression. While research demonstrates the associations between infant-directed action and infants' object exploration (Koterba & Iverson, 2009) and infant-directed speech (Gogate et al., 2000; Nelson, Hirsh-Pasek, Jusczyk, & Cassidy, 1989) as well as mother–child

games (Camaioni & Laicardi, 1985; Ratner & Bruner, 1978) and children's language development, few studies have focused on the influence of mothers' infant-directed affective expressions (vocalizations and facial affect) on infants' emotional development, despite the evidence of effectiveness in eliciting positive affect in infants (Fernald, 1993). If mothers' infant-directed affective expression becomes the focus as a behavior that elicits and heightens infants' positive emotion, it is presumed to be closely associated with how intensely infants develop their emotional expression. Thus, as one of the main aims of the current study, the relationship between mothers' emotion-arousing behaviors and infants' intensity of emotional expression is examined. Since this is an exploratory study, there is no specific hypothesis in terms of the direction of this relationship. The relationship may be positive if infants' expression of positive emotions is reinforced and amplified by mothers who tend to initiate emotion-arousing behaviors more and if mother–infant dyads engage in the process of heightening positive emotions more often. Previous literature demonstrating the effectiveness of motherese in eliciting infants' attention (Fernald, 1985) and positive emotions (Fernald, 1993) supports this hypothesized direction of the relationship. As mothers' infant-directed speech and vocalization were successful in immediately arousing infants, if mothers show these behaviors more often, infants may generally develop more intense expression of positive emotions. Conversely, the relationship may be negative if mothers actively attempt to elicit positive reactions from infants who tend to be more affectively neutral or less expressive in terms of their emotions.

Infants' effect on mothers' emotion-arousing behaviors. As the nature of mother–infant communicative interaction is bidirectional, it is necessary to consider infants' effects on mothers' behaviors as well as mothers' effects on infants' behaviors and development. Bell (1974) demonstrated how infants can influence mothers in how they initiate and maintain the

social interaction system through the homeostatic model. According to this model, infants have upper and lower limits in terms of the intensity or frequency of their mothers' behavior. Consequently, infants reduce the excessive behavior of mothers if the upper limit is reached (upper-limit control reaction), and they stimulate the insufficient behavior of mothers if the lower limit is reached (lower-limit control reaction) (Bell, 1974). The principle of upper/lower-limit control reaction has been shown in infants' effects on mothers' singing. Mothers' infant-directed singing is considered an emotion-arousing behavior due to its high pitch, slow tempo, and acoustic indicators of heightened emotionality (Trainor, Clark, Huntley, & Adams, 1997; Trehub, Unyk, & Trainor, 1993) and its effectiveness in getting infants' attention (Masataka, 1999; Trainor, 1996). Previous studies have suggested that mothers' singing has regulatory effects on infants' emotions. According to Shenfield's (2003) study, maternal singing modulates infants' arousal levels: It increased cortisol levels for infants with lower baseline levels but reduced cortisol levels for infants with higher baseline levels. In addition, Rock, Trainor, and Addison (1999) found two distinctive styles of infant-directed singing—namely, the play-song singing style and the lullaby singing style. These styles elicited different reactions. While the play-song singing style resulted in infants' paying more attention to their mothers, the lullaby singing style led to infants' paying more attention to themselves. This indicates that mothers' play-song singing can arouse a lethargic infant while their lullaby singing can calm an active infant. Since the play-song style has a more smiling tone (Rock et al., 1999), it is the style of singing observed as an emotion-arousing behavior in this study. This evidences that emotion-arousing behavior may be used more often by mothers of infants who are low in their intensity of positive emotional expression.

Cultural Differences in Mothers' Encouragement of Positive Emotional Responses

Although mothers' infant-directed expressions that are distinctly different from adult-directed expressions are found throughout many cultures (Darwin, 1872; Chong et al., 2003; Fernald et al., 1989; Grieser & Kuhl, 1988; Papoušek & Hwang, 1991; Trehub et al., 1993), their specific features or degree of prevalence may differ across cultures, depending on the different cultural values and goals related to parenting. Cross-cultural research on infant-directed expressions demonstrates that English-speaking mothers tend to have more exaggerated infant-directed facial expressions than Chinese-speaking mothers (Chong et al., 2003), and American parents' infant-directed speech was revealed to be more exaggerated than French, Italian, German, Japanese, and British parents, as their prosodic modifications were the most extreme (Fernald et al., 1989). Further, Japanese infant-directed vocalizations were the least intense relative to German and Italian mothers' infant-directed vocalizations (Fernald, 1993). Fernald (1992) argued that these results may be due to American culture, where emotional expressiveness is valued and encouraged. Therefore, differences in the features of infant-directed expressions may reflect emotion-display rules; these rules may reflect cultural values of independence (which encourages self-expression) or the cultural value of interdependence (which values social harmony) (Keller, 2010; Klimes-Dougan & Zeman, 2007).

Because mothers use infant-directed expressions to maintain positive emotional states during mother–infant interactions, focusing on cultural socialization goals and values related to positive emotions may be a useful way in which to explain the cultural differences in mothers' infant-directed expressions. Research on adults' emotions has revealed that Western cultures place more of a value on high-arousal positive emotions (e.g., excitement) and less of a value on low-arousal positive emotions (e.g., calmness or contentment) than people from Eastern cultures

(Tsai et al., 2006). This cultural difference in preferences for excitement versus calmness has also been supported by neural evidence (Park et al., 2016). Further, a review by Kärtner, Holodynski, and Wörmann (2013) on the culture-specific development of infants' social smiles highlighted that infants' calmness and positive excitement should be regarded as two different qualities of pleasure that are influenced by mothers' preferences, which are based on their culturally specific socialization goals.

Previous cultural studies on infant-directed expressions focused on comparing the intensities of said expressions across cultures. However, cultural differences in the prevalence of infant-directed expressions during parent–infant interactions remains unknown. Since the focus of the present study is mothers' emotion-arousing behaviors rather than infant-directed expressions, the duration of emotion-arousing behaviors in five-minute free play was used to measure the prevalence of mothers' emotion-arousing behaviors. Taken together, the current study aims to examine if mothers show emotion-arousing behaviors more in one culture than in another.

Current Study

The focus of the current study is mothers' emotion-arousing behaviors (i.e., the behaviors that mothers initiate while they interact with their infants in order to elicit and heighten infants' positive emotions). While some studies have researched mother–infant games (Crawley et al., 1978; Field, 1979; Yogman, 1981), which are assumed to overlap with emotion-arousing behaviors, these behaviors have not been covered. In addition, only a few studies have looked at cultural differences in these behaviors (Fernald & O'Neill, 1993; van Hoorn, 1987). Thus, the current study aims to explore the natural frequency and range of these behaviors in actual mother–infant interactions and examine the cultural differences in these behaviors.

As mothers' emotion-arousing behaviors may play a role in terms of how mothers socialize positive emotions, we also investigate the relationship between emotion-arousing behaviors and infants' positive emotional expressions as well as how this relationship differs across cultures. Specifically, a cultural comparison of emotion-arousing behaviors is expected to reflect different cultural values of positive emotions. Our study sample is comprised of U.S. mother–infant dyads and Korean mother–infant dyads. Based on the literature review of different cultural values of emotional expressiveness and emotional levels of arousal between Western and Eastern cultures, U.S. mothers may show more emotion-arousing behaviors than Korean mothers. However, the hypothesis regarding cultural differences in mothers' emotion-arousing behaviors may show reverse patterns when infants' effects on mothers' behavior are considered. As explained previously, mothers may vary their behavior depending on their infants' characteristics or state in order to reach the optimally positive state of mother–infant interaction. In this sense, Korean mothers may make more efforts to elicit infants' positive emotions, as their infants tend to be neutral or less intense in their pleasure expression compared to U.S. infants.

Research questions and hypotheses. The purpose of the current study is to explore U.S. and Korean mothers' emotion-arousing behaviors and examine the cross-cultural differences in these behaviors. This leads me to the first research question—namely, are there any specific behaviors that U.S. and Korean mothers perform to heighten their infants' positive emotional responses? Although this is an exploratory study that poses no specific hypothesis, I assume that behaviors, such as infant–mother social games (e.g., peek-a-boo) (Crawley et al., 1978; Field, 1979; Sroufe & Wunsch, 1972), are presented as mothers' emotion-arousing behaviors. However, I also presume that there are other types of emotion-arousing behaviors aside from games. Once a list of emotion-arousing behaviors is established, the number of mothers in each

culture who have performed each behavior will be explored. I hypothesize that there may be culturally specific sets of arousal behaviors, or at least that some behaviors will be more common in one culture than the other.

Next, I ask whether there is any cultural differences in the use of mothers' emotion-arousing behaviors as my second research question. Each subject's total duration of emotion-arousing behaviors will be used for cultural comparison. While there is no strong hypothesis related to this question, I consider two possible directions in terms of the cultural differences in mothers' emotion-arousing behaviors. Mothers' emotion-arousing behaviors may be shown more in the U.S. sample than the Korean sample, since they value high-arousal positive emotions more than low-arousal positive emotions. Conversely, Korean mothers may spend more time performing emotion-arousing behaviors if certain behavioral aspects of their infants, such as low emotional expressiveness, affect mothers' attempts to perform these behaviors.

The last research aim of this study is to determine whether there are any associations between mothers' emotion-arousing behaviors and infants' positive emotional expressions. As mentioned previously, no specific hypothesis is posed. Whether the direction of the relationship between mothers' emotion-arousing behaviors and infants' intensity of emotional expression is positive or negative will be explored.

Method

Participants

As the present study is a cross-cultural research, this study includes two cultural groups: US and Korean samples. The U.S. sample was derived from a larger sample collected for the Cross-Cultural Development of the Expression of Emotion (CCEE) study. The CCEE study is a

longitudinal research project, which investigates young children's development of expression, labeling, and comprehension of emotions in Chile and the United States. Primary caregiver and infant dyads participated the CCEE study, and the US sample size of the first wave of the CCEE study was seventy-two. However, the current study includes sub-sample of the participants of the CCEE study in order to be equivalent with Korean sample. Of the larger U.S. sample at the first CCEE wave, the sub-sample for this current study included infants whose age is between 10 to 14 months, those who participated with mothers (not fathers or other caregivers, used English as their home language, and were from families considered as either high or middle socio-economic status (SES). Furthermore, additional participants were excluded as their videos turned out to be not capturing the faces of mothers and infants appropriately during the 5-minute free play session,

The final U.S. sample for the present study included 35 infants (18 girls) and their mothers. All of these mother–infant dyads lived in the Mid-West United States. The infants' age was between 10 and 14 months (M=11.46, SD=1.27), and the mothers' age was between 21 and 41 years (M=31.97, SD=4.35). The mothers in the U.S. sample included 28 European American (80.0%), 4 African American (11.4%), and one Arabic (2.9%). There were two mothers who did not identify their ethnicity. The mothers' education level raged from high school completion to graduate degree (5.7% completed high school, 5.7% completed an associate degree, 42.9% completed a bachelor degree, and 45.7% started or completed graduate degree). Based on the parents' educational level and occupations, twenty mother–infant dyads were considered high SES (60.0%) and 14 mother–infant dyads were considered middle SES families (40.0%).

Twenty-nine Korean infants (15 girls) and their mothers living in Seoul, Gyeongi-do, and Gyeonsangbuk-do Province participated in this study. Infants' age was between 10 to 14 months

(*M*=12.14, *SD*=1.46), and mothers' age was between 27 to 38 years (*M*=32.48, *SD*=3.24). The mothers' education levels were as follow: 13.8% completed high school, 10.3% completed an associate degree, 27.6% completed a bachelor degree, and 48.3% started or completed a graduate degree. Regarding family SES, 18 infants were from high SES families (62.1%) and 10 infants were from middle SES families (34.5%). There was one missing data as one mother did not choose to identify their occupation level.

Two-sample *t*-tests examining differences between U.S. and Korean samples in infants' age, mothers' age, mother's education level, and family SES were conducted (see Table 7). No significant difference was found in infants' age, mother's age, education level, and SES.

Table 7.
Demographic Information for U.S. and Korean Samples for Study 2

	U.S.	Korean	
	M(SD)	*M(SD)*	*t*
Infant age	11.46 (1.27)	12.13 (1.46)	-2.00
Mother age	31.97 (4.35)	32.48 (3.24)	-0.52
Mother education			0.77
High school	2 (5.7%)	4 (13.8%)	
Associate degree	2 (5.7%)	3 (10.3%)	
Bachelor degree	15 (42.9%)	8 (27.6%)	
Graduate degree	16 (45.7%)	14 (48.3%)	
SES			-0.34
Middle SES	14 (40.0%)	10 (34.5%)	
High SES	21 (60.0%)	18 (62.1%)	

Note. *M* = Mean; *SD* = Standardized deviation.

Procedures

Mother–infant dyads were recruited through the childcare center and online communities for sharing information and resources related to childcare and parenting. Research coordinator contacted mothers who showed their interest in participating the study. Research visits were scheduled when their infants' age was between 10 and 14 months.

Research team visited either the childcare centers or families' home for data collection. Nineteen U.S. data were collected at the childcare centers and 16 U.S. data were collected at the families' home. All Korean data were collected at the families' home. Usually, the research team was composed of two graduate or undergraduate research assistants. First, the researcher explained briefly about the study, then the mother gave informed consent. The main data collection process, which was video recorded, started with the 5-minute mother–infant free play. Age-appropriate toys (i.e., a doll with a bottle, a blanket, a car, puzzle, a Teddy bear, blocks, a rattle, and a book with images) were located on a blanket on the floor. The mothers were asked to play as they generally do in their daily life. The following session after 5-minute free play was the Gesture Assessment in Children (Farkas & Vallotton, 2012). For this assessment, four challenging tasks were given to the infants while their mothers sitting by them. After these two sessions, mothers completed questionnaires asking about their demographic information and infants' temperament. Infants received a book and mothers received a gift card for their participation in the study.

Measures

Mothers' emotion-arousing behaviors. Mothers' emotion-arousing behaviors were measured by coding the five-minute mother–infant free play. A coding system was developed for the purpose of this study. The coding system for emotion-arousing behavior is exploratory since there is no existing coding system that measures this aspect of parenting behavior.

Coding. To measure mothers' emotion-arousing behaviors, an initial set of behaviors that have the characteristics of multimodal motherese and motionese (e.g., exaggerated facial expression, intonation, and motion; rhythmical speech/vocalization; repetitive action and speech/vocalization; etc.), identified by previous studies (Brand et al., 2002, 2007; Chong et al.,

2003; Fernald & Simon, 1984; Grieser & Kuhl, 1988; Stern et al., 1982) were included in the coding system. As I developed the coding system, I found that an important indicator, which confirms that the behavior was intended to elicit positive emotional responses from the infant, was repetitiveness of the behavior. This finding was based on the observations from the pilot data. Therefore, every event of mothers' infant-directed behavior that occurred repetitively was coded. In addition, mothers' and infants' affect was coded. For every event of an affect change, the coders coded mothers' and infants' affect (*highly negative, negative, neutral, positive, highly positive*) based on their facial expressions. In the current study, the operational definition of mothers' emotion-arousing behaviors is mothers' repetitive behavior observed with a positive or highly positive affect. In the majority of cases, the mothers initiated their emotion-arousing behaviors. However, several behaviors were originally initiated by infants' behaviors. The duration of the mothers' emotion-arousing behaviors during the five-minute free play was used for the analysis. Inter-coder reliability was between 71% and 100%.

Intensity of infants' emotional expression. Four tasks from the Gesture Assessment in Children (Farkas & Vallotton, 2012) were given to the infants to measure intensity of infants' emotional expression. The first two tasks, called as *success tasks*, were intended to elicit positive emotions (e.g., happiness, pleasure, and satisfaction) from infants. The next two tasks, called as *frustration tasks*, were intended to induce infants' negative emotions (e.g., frustration, irritation, and dissatisfaction).

Success tasks. Two success tasks were given to the infants while the instruction was given to the mothers to help their infants to complete the tasks. In the first task, the infants had to put three blocks in a bucket. For the second task, first, the mothers built a tower with five blocks,

and then, they encouraged their infants to knock it down. When the infants completed each task, the mothers were asked to congratulate them.

Frustration tasks. Two frustration tasks were led by the researcher. At the beginning of this session, the researcher asked the mother not to help their infants complete the tasks, however, the mothers were able to encourage their infants by talking to them such as "You can do it," or "Almost." For the first task, the researcher, first, put mittens on the infant's both hands. Then, the researcher banged a drum with drumsticks and put the drumsticks on the floor near the infant. The infants were encouraged to play the drum or pick up the drumsticks. For the last task, the researcher asked the infant to take off the mittens.

Coding. The most intense expressions of pleasure and discomfort were selected throughout the four challenging tasks. Coders, first, created a window of 2 seconds before and after the most intense expressions (4 seconds total). Then, they coded whether each feature of the face (e.g., forehead, eyebrows, eyes, and mouth) and body (e.g., head, torso, arms/hands, and legs) was used to express the emotions by coding either involved as "1" or not involved as "0". The sum of the number of face and body areas involved in the expression was the score for intensity of emotional expression. Inter-coder reliability ranged from 89% to 100%.

Results

Preliminary Analysis

The mean and standard deviations of the study variables are shown in Table 8. To test the relationships between the variables in each culture, a bivariate correlation analysis using Pearson's correlation coefficient was run separately for the U.S. and Korean samples (see Table 9). In the U.S. sample, none of the relationships between each variable were significant. In the Korean sample, there was a positive relationship between the number of facial features used for infants' pleasure expression and the number of body parts used for infants' pleasure expression ($r = .57$, $p < .01$).

Table 8.
Descriptive Statistics of Variables for Study 2

Variables	*M(SD)*
Mothers' emotion-arousing behavior	
Total duration (sec) of emotion-arousing behaviors occurred during the 5-minute play	31.42 (25.62)
Infants' intensity of emotional expression	
Number of face parts used for pleasure expression	2.68 (1.00)
Number of body parts used for pleasure expression	2.46 (1.35)

Note. *M* = Mean; *SD* = Standardized deviation.
42.2% of mothers showed emotion-arousing behavior.
89.1% of infants expressed pleasure.

Table 9.
Bivariate Pearson Correlation among Variables for Study 2

	1. Total duration (sec) of emotion-arousing behaviors	2. Number of face parts used for pleasure expression	3. Number of body parts used for pleasure expression
1	-	-.01	.23
2	-.39	-	.24
3	-.46	.57**	-

** $p < .01$
Note. Correlation shown above diagonal is correlation for U.S. sample and correlation shown below diagonal is correlation for Korean sample.

Specific Emotion-Arousing Behavior in the United States and Korea

Ten examples of specific emotion-arousing behavior were shown in our study sample. The number of mothers who showed each emotion-arousing behavior in the U.S. and Korean samples is displayed in Table 10. Thirteen U.S. mothers showed eight kinds of emotion-arousing behaviors, while 14 Korean mothers showed nine kinds of emotion-arousing behaviors. The variety of emotion-arousing behaviors per mother in each culture was 1.46 in the U.S sample and 2.21 in the Korean sample. This indicates that on average, Korean mothers performed at least two types of emotion-arousing behaviors.

Table 10.
List of emotion-arousing behaviors and the number of U.S. and Korean mothers showing each behavior

Emotion-arousing behaviors	U.S.	Korean
Peek-a-boo	5	5
Teddy bear/baby doll hugging and kissing	5	4
Tickling	3	1
Singing	1	4
Shake-shake the rattle	1	3
Dancing	1	1
Hugging/kissing	1	0
Praising/clapping	0	4
Finger play/head-movement play	0	4
Others (exaggerated expression/action)	2	5
Total	19	32

There were eight types of emotion-arousing behaviors exhibited by U.S. mothers. Korean mothers exhibited nine types of emotion-arousing behaviors. Of the 10 emotion-arousing behaviors in total, seven were shown by mothers in both countries. The two most commonly shown emotion-arousing behaviors in both countries were *peek-a-boo* and *Teddy bear/baby doll hugging and kissing*. In Korea, three other examples of common emotion-arousing behaviors were *singing, praising/clapping*, and *finger play/head-movement play*. *Hugging/kissing* was

exhibited only by U.S. mothers, whereas *praising/clapping* and *finger play/head-movement play* were shown only by Korean mothers.

The following are examples of mother–infant interactions where mothers initiated emotion-arousing behavior.

1. *Peek-a-boo*

The mother hides her face behind a blanket. Then she removes the blanket from her face and shows her face, saying "peek-a-boo" with exaggerated facial expressions that include smiling with a wide-open mouth, lifted eyebrows, and widened eyes.

2. *Teddy bear/baby doll hugging and kissing*

The mother makes the teddy bear (or baby doll) nuzzles and kisses the baby, making several "mwah" sounds with an exaggerated tone of voice. The baby kisses the teddy bear (or baby doll) in return or giggles in response to the mother's behavior.

3. *Tickling*

The mother raises her hands high at first, and her hands come closer to the baby, then she tickles the baby with an exaggerated/rhythmical voice and says "Gonna get you, get you, get you!"

4. *Singing*

The mother sings to the baby, usually using hand motions. Typically, the mother keeps the beat by banging blocks or nodding her head while she sings. Most of the time, the baby

expresses their enjoyment by giggling, shaking a rattle, or singing/humming along with the mother.

5. *Shake-shake the rattle*

The baby picks up a rattle, the mother says "shake-shake" and shakes her hands. Her "shake-shake" voice gets louder, higher, more intense, and more rhythmical.

6. *Dancing*

The mother holds and shakes the baby's hands and says "dance-dance," "let's dance," or "Dun-ga, dun-ga"[1] in a rhythmic manner. The mother also usually dances or shakes her body.

7. *Hugging/kissing*

The mother lifts the baby up and then gives them hugs and kisses. She intentionally makes loud kissing sounds and talks to the baby using motherese. The baby giggles in response to this behavior.

8. *Praising/clapping*

The mother praises the baby for what they are doing. To convey her praise, she claps for a while using exaggerated gestures, facial expressions, and loud rhythmic exclamations such as "good job, good job!"

[1] A Korean exclamation people use when holding and humoring a baby.

9. *Finger play/head-movement play*

There were four different finger plays/head-movement plays shown in this study, and all of them were exhibited by Korean mothers only.

A. Nose-nose-nose

The mother points to her nose and says "nose-nose-nose-nose-nose," pauses for a second, then calls out other parts of her face, such as her eye, while pointing to that part. She specifically uses motherese when she calls out the other parts of her face.

B. Clap-clap ("Jjock-jjock-kkoong") and "Jam-jam"

The mother claps and rhythmically says "Jjock-jjock-kkoong, jjock-jjock-kkoong." Then, she repeats the movement of quickly opening and closing her hands and saying "Jam-jam" at the moment she closes her hands.

C. *Se-se-se* (similar to finger play in the United States)

The mother and baby hold each other's hands and shake their hands up and down, chanting "se-se-se" rhythmically. She repeats this several times. The mother also makes the baby do this with a teddy bear.

D. *"Dori-dori"*

The mother shakes her head side to side and rhythmically says "dori-dori-dori-dori." She repeats this several times.

Cultural Differences in Mothers' Emotion-Arousing Behaviors

Proportion of mothers who showed emotion-arousing behaviors. Using a two-proportion *z*-test, cultural differences in the proportion of mothers who showed emotion-arousing behaviors were examined. Mothers' emotion-arousing behaviors were shown during the five-minute play by 13 out of 35 U.S. mothers (37.1%), whereas they were shown by 14 out of 29 Korean mothers (48.3%). However, the difference in the proportion was not statistically significant (z = -.90, *n.s.*).

Duration of emotion-arousing behavior. To test if there is any difference between the two cultures in terms of the duration of mothers' emotion-arousing behaviors, a one-way ANOVA was conducted (see Table 11). Since the variances in each culture turned out to be inhomogeneous based on Levene's test, Welch's one-way ANOVA was used. The total duration of Korean mothers' emotion-arousing behaviors was marginally longer than that of U.S. mothers' [$F_{(1, 19.5)} = 3.07$, $p < .10$].

Table 11.
Result of One-Way ANOVA Comparing Emotion-Arousing Behavior between U.S. and Korean Mothers

Variables	*M(SD)*		*F*
	U.S.	Korea	
Mothers' emotion-arousing behavior			
Total duration (sec) of emotion-arousing behaviors occurred during the 5-minute play	22.96 (15.55)	39.27 (30.86)	3.07^{+}

$^{+}$ $p < .10$
Note. *M* = Mean; *SD* = Standardized deviation.

Relationship between Mothers' Emotion-Arousing Behaviors and Infants' Pleasure Expression

Differences in the duration of mothers' emotion-arousing behavior between infants who expressed pleasure and infants who did not express pleasure. In order to determine the differences in the duration of mothers' emotion-arousing behaviors between infants who expressed pleasure and those did not express pleasure, a *t*-test was conducted (see Table 12). Mothers of infants who did not express pleasure exhibited longer durations of emotion-arousing behaviors ($t = 2.03$, $p < .10$).

Conducting a *t*-test was only possible for the Korean sample. Since there was only one U.S. infant who did not express pleasure, a *t*-test could not be run for the U.S. sample. The duration of mothers' emotion-arousing behavior between the two groups of infants was not significantly different for the Korean sample ($t = 1.00$, *n.s.*). However, when the patterns of means in each group were explored for both samples, the patterns were shown to move in the same direction: In both samples, mothers of infants who did not express pleasure exhibited longer durations of emotion-arousing behaviors.

Table 12.
Result of T-Test Comparing Emotion-Arousing Behavior between Pleasure-Expressed and Not-Expressed Infants

Variables	*M(SD)*		*t*
	Expressed Infants	Not Expressed Infants	
Mothers' emotion-arousing behavior Total duration (sec) of emotion-arousing behaviors occurred during the 5-minute play	26.91 (20.35)	51.25 (38.59)	2.03^{+}

$^{+}$ $p < .10$
Note. *M* = Mean; *SD* = Standardized deviation.

Difference in the infants' intensity of pleasure expression. To examine the differences in the infants' intensity of pleasure expression when mothers exhibited emotion-arousing behaviors and when mothers did not, *t*-tests were conducted. There was no significant difference in the infants' intensity of pleasure expression between the two groups of mothers (facial intensity, $t = 0.28$, *n.s.*; corporal intensity, $t = 1.02$, *n.s.*). Next, *t*-tests were run separately for each country (see Table 13). There was a marginally significant difference in the corporeal intensity of pleasure expression across both groups for the U.S. sample, thus showing a higher corporeal intensity in mothers who did not exhibit emotion-arousing behaviors ($t = 1.87$, $p < .10$), but there was no difference in the facial intensity of pleasure expression ($t = 0.95$, *n.s.*). Korean infants' intensity of pleasure expression was not significantly different across groups (facial intensity, $t = -0.69$, *n.s.*; corporal intensity, $t = -0.59$, *n.s.*).

Table 13.
Results of T-Tests Comparing Infants' Intensity of Pleasure Expression between Emotion-Arousing Behavior (EAB) Shown and Emotion-Arousing Behavior Not Shown Mothers

Variables	*M(SD)*		*t*
	EAB Shown Mothers	EAB Not Shown Mothers	
U.S. infants' intensity of emotional expression			
Number of face parts used for pleasure expression	2.42 (0.79)	2.77 (1.15)	0.95
Number of body parts used for pleasure expression	2.25 (1.06)	3.05 (1.25)	1.87^{+}
Korean infants' intensity of emotional expression			
Number of face parts used for pleasure expression	2.90 (0.88)	2.62 (1.04)	-0.69
Number of body parts used for pleasure expression	2.20 (1.62)	1.85 (1.28)	-0.59

$^{+}$ $p < .10$
Note. *M* = Mean; *SD* = Standardized deviation.

Post-Hoc Analyses

Although the infants' temperament was not a principle focus of this study, post-hoc analyses were conducted on the infants' extraversion, which is one dimension of temperament. In order to measure infants' extraversion, the IBQ-R-VSF (Putnam & Rothbart, 2006) was used once again. Extraversion is one of the dimensions of temperament that the IBQ measures.

First, cultural differences in extraversion were examined to find a possible explanation for the unexpected result regarding the cultural differences in mothers' emotion-arousing behavior. An ANOVA was run to test any cultural differences in the infants' extraversion. As a result of the ANOVA, U.S. infants were found to be marginally more extraverted than Korean infants [$F_{(1, 59)} = 3.05$, $p < .10$].

Next, the extraversion of infants whose mothers showed emotion-arousing behaviors was compared to that of infants whose mothers did not show any emotion-arousing behaviors. Results of the *t*-tests revealed that differences in infant extraversion between these two groups was only shown in the Korean sample: The infants of mothers who did not show emotion-arousing behaviors were marginally more extraverted than the infants of mothers who showed emotion-arousing behaviors ($t = 1.73$, $p < .10$). No significant group difference was found in the U.S. sample.

Discussion

During emotional communication between mothers and infants, mothers often attempt to elicit positive emotions from their infants and heighten their infants' positive emotions. The purpose of this study was to explore these unique behaviors (i.e., emotion-arousing behaviors) of mothers toward infants and determine what role emotion-arousing behaviors play in parental

emotion socialization by comparing mothers from the United States and South Korea. Surprisingly, the majority of these behaviors were revealed as mother–infant games. However, the current study is significant in that mothers' behaviors during mother–infant games were explored in terms of their association with infants' affect, which comprises a new framework for viewing these behaviors. Further, this study investigated the cultural differences in mothers' emotion-arousing behaviors and whether mothers' emotion-arousing behaviors were related to infants' development of emotional expression. There are two main findings in terms of these relationships: Mothers' performance of emotion-arousing behaviors and how much they perform these behaviors are associated with the mothers' cultural backgrounds and their infants' development of emotional expression.

Cultural Differences in Mothers' Emotion-Arousing Behaviors

The current study revealed that mothers' emotion-arousing behaviors were more prevalent in Korean than U.S. mothers. Although the difference in the proportion of mothers who showed emotion-arousing behaviors was not significant, 48.3 percent of Korean mothers showed emotion-arousing behaviors, while 37.1 percent of U.S. mothers showed emotion-arousing behaviors. Moreover, compared to U.S. mothers, Korean mothers took more time to perform emotion-arousing behaviors when they played with their infants. Based on previous research (Park et al., 2016; Tsai et al., 2006), which revealed that Western cultures value high-arousal positive emotions more than Eastern cultures, the current finding may be seen as an unexpected result. There are two ways to explain this unexpected finding. First, when temperament was considered, U.S. infants were marginally more extraverted than Korean infants. It may be that Korean mothers had to spend more time performing emotion-arousing behaviors, since positive emotions were not easily elicited from their less-extraverted infants. While infants' extraversion

and emotion-arousing behaviors were not significantly correlated individually in this study, infants' extraversion may be still related to emotion-arousing behaviors at a population level.

Second, the increasing use of emotion-arousing behaviors by Korean mothers in comparison to U.S. mothers may be a result of the different roles mothers adopt in mother–infant play due to their different cultural values. Korean mothers, who have a cultural background oriented toward interdependence and relatedness, may adopt a directive role in mother–infant play and thus actively attempt various behaviors to elicit positive emotions from their infants. Since there is evidence that parents taking directive roles had children who rated lower for autonomy (Russell, Mize, & Saebel, 2001), mothers who are directive during mother–infant play are more common in Korea, where the culture does not emphasize one's autonomy as much as Western culture does. However, U.S. mothers, whose culture is oriented toward independence and autonomy, may adopt the role of facilitator or observer in mother–infant play. As a result, they may let the infant take the lead in play and avoid using emotion-arousing behaviors until their infants are very quiet or disengaged. To conclude, when emotion-arousing behaviors are viewed as a mothers' initiative to change their infants' level of arousal or engagement, cultural difference in mothers' parenting beliefs such as what role they should take in mother–infant play seems to be a better explanation than the cultural value placed on high-intensity emotions.

Relationship between Mothers' Emotion-Arousing Behaviors and Infants' Pleasure Expression

Regarding the relationship between mothers' emotion-arousing behaviors and infants' pleasure expression, a finding of this study was that mothers of infants who did not express pleasure showed emotion-arousing behaviors more often than mothers of infants who expressed pleasure. This result can be explained by Bell's (1974) homeostatic model, which highlights the

bidirectional effect of infants and mothers' behaviors based on upper- and lower-limit control reactions. The current study's finding implies that mothers show more emotion-arousing behaviors to heighten their infants' positive emotions when their infants have restricted pleasure expression. On the contrary, mothers do not need to show many emotion-arousing behaviors if their infants already express pleasure in an intense way.

Another finding in this regard was the difference in the intensity of pleasure expression among infants whose mothers showed emotion-arousing behaviors and whose mothers did not. This difference was marginally significant in the U.S. sample but not in the Korean sample. In the former, more intense pleasure expression, especially corporeal expression, was shown by infants of mothers who did not show emotion-arousing behaviors. This supports the homeostatic model (Bell, 1974), and similar to the previous finding, but in the opposite direction, mothers showing emotion-arousing behaviors were related with infants who suppressed their intensity of pleasure expression in the U.S. sample. These infants seemed to dampen their own emotions, as they perceived that their mothers' behaviors had reached the upper limit. Conversely, infants whose mothers do not show emotion-arousing behaviors are likely to express more intense pleasure to encourage their mothers' insufficient behaviors. However, whether mothers show emotion-arousing behaviors or not did not make any difference in the intensity of pleasure expression for the Korean infants. A possible explanation for this is that Korean mothers' emotion-arousing behaviors may be more focused on eliciting positive emotions rather than heightening them. Since infant extraversion was lower for mothers who showed emotion-arousing behaviors compared to mothers who did not show emotion-arousing behaviors in the Korean sample, Korean mothers who showed emotion-arousing behaviors seemed to focus on eliciting positive emotions from relatively less-extraverted infants. As a result, once their infants'

positive emotions were elicited, the infants' intensity of positive emotions did not differ depending on whether their mothers exhibited emotion-arousing behaviors.

Strengths, Limitations, and Future Directions

The current study focused on mother–infant dyads from the United States and Korea who were equivalent in terms of age, maternal education, and family SES. However, some limitations should be considered when the results of this study are interpreted. First, generalizing the study's findings to broader cultures should be done with caution. The present study did not include families of low SES, and the study samples were collected from specific regional areas of each country. Thus, the findings need to be interpreted carefully, as the samples are not representative of whole populations of these countries or cultures. Second, since fewer than 50 percent of participants from each cultural sample showed emotion-arousing behaviors, which is the main focus of this study, our analyses had to be limited to simple comparisons across groups. However, this study was intended to be an exploratory study regarding mothers' emotion-arousing behaviors and is expected to form the basis of future studies that could potentially yield more data to enable more detailed and complex analyses.

Aside from these limitations, the present study also has considerable strengths that should be acknowledged. First, this study suggests a new term, "emotion-arousing behaviors," and directs our attention to a set of distinct behaviors mothers perform with infants in order to arouse infants' positive emotions. While most research studies on maternal–infant emotion regulation and emotion socialization are focused on strategies for calming negative emotions, this study focuses on a different aspect of emotion regulation and socialization—namely, the arousal of positive emotions. Although a subset of these maternal behaviors has been examined in prior research on parent–infant games, an examination of the *functions* of these behaviors in emotion

arousal is new, as is the fact that a cross-cultural examination was conducted. The current findings show that mother–infant games and other emotion-arousing behaviors play a role in positive emotional communication between mothers and infants. As this study qualitatively explored and discovered specific behaviors, considered here to be emotion-arousing behaviors, this information will be useful for the development of accurate and detailed measures in such behaviors in the future, and these behaviors could be used to examine the roles of emotion-arousing behaviors in emotion socialization and children's emotional and communication development over time. In addition, it would be useful to expand our knowledge of these emotion-arousing behaviors by interviewing mothers about the kinds of behaviors they use to elicit and heighten their infants' positive emotions as well as their understanding of the purpose of these behaviors. Such qualitative investigations could strengthen our understanding of cultural differences in positive parenting behaviors that are related to cultural child-rearing goals and values.

Moreover, not limiting itself to simply exploring mothers' emotion-arousing behaviors, the current study also examined how mothers' emotion-arousing behaviors relate to their cultures and their infants' emotional expression. The results hinted at an understanding of the factors that elicit mothers' use of emotion-arousing behaviors by suggesting possible explanations for the relationships between these variables. For example, it may be their cultural perspective in relation to independent or interdependent self-construal that influences mothers' display of emotion-arousing behaviors. However, it may also be due to mothers attempting to regulate the level of arousal of emotional communication with their infants, depending on their infants' intensity of emotional expression. Thus, revealing the relationships between mothers' emotion-

arousing behaviors and other influencing factors shines a light on what drives mothers to use emotion-arousing behaviors with infants.

Conclusion

The current study comprises an exploratory examination of mothers' emotion-arousing behaviors, unique behaviors of mothers toward young children. Specific emotion-arousing behaviors were observed in two countries: the United States and South Korea. Cultural differences in mothers' emotion-arousing behaviors imply that mothers' emotion-arousing behaviors play a role in the cultural socialization of emotion and communication, similar to other parenting behaviors. In addition, the relationships between mothers' emotion-arousing behaviors and infants' emotional expression indicate that mothers and infants regulate each other's arousal level of positive emotions when they interact with each other.

CHAPTER 4. GENERAL DISCUSSION

Infants begin engaging in social interaction quite early in their lives, primarily with their parents and other regular caregivers. Early interaction between an infant and a parent forms a unique characteristic and is sustained as mothers modulate their rhythms, modify their repertoires, and contingently respond to each other (Field, 1978). Within these interactions, caregivers, as the most proximal environment, socialize infants in ways that are influenced by their cultural values and norms. The focus of the current dissertation was emotional communication between mothers and infants from a cross-cultural perspective. Specifically, this study examined mother–child interactions through the lens of emotional socialization by investigating associations between maternal interaction behaviors and infants' development of emotional expressions. The first study (chapter 2) focused on infant-elicited aspects of parenting behaviors, with a specific emphasis on mothers' responsiveness to infants' emotional cues. The second study (chapter 3) focused on mother-generated aspects of parenting behavior, which includes emotion-arousing behaviors that serve to heighten infants' positive emotions. In each study, cultural differences in the mothers' parenting behaviors and infants' emotional expressions were examined. In addition, culture-specific relationships between each parenting behavior and the infants' emotional expressions were explored, treating culture as a context in which the meaning (and therefore the strength or direction) of these associations may differ.

Modification of the Theoretical Model

The theoretical model that was initially proposed in this dissertation reflected the dominant ideas in the current literature, especially regarding culture influencing infants' emotional expression through parenting behaviors (Holodynski, 2013) (see Figure 1). As

cultural-specific relationships between parenting behaviors and infants' emotional expressions were consistently shown throughout the two studies of this dissertation, the role of culture is described in a more expansive way in the new theoretical model (see Figure 3). Furthermore, although the initial theoretical model included two parenting behaviors that are each in the context of mother–infant communication, this model did not include any possible direct effect of infants shaping parenting behaviors. Infants' effects on parenting behaviors was posed as a possible explanation for my findings on mothers' emotion-arousing behaviors; therefore, this aspect is reflected in the new model. In addition, infant temperament was analyzed via *post hoc* analyses to better understand the effect of infants, and the potential role of infant temperament is also suggested in the new model. In sum, this dissertation contributes to a new understanding of the processes of cultural socialization of emotional expression by adding infants' effect on parenting behaviors as well as cultural influence on the *relationships* between parenting behaviors and infants' emotional expressions.

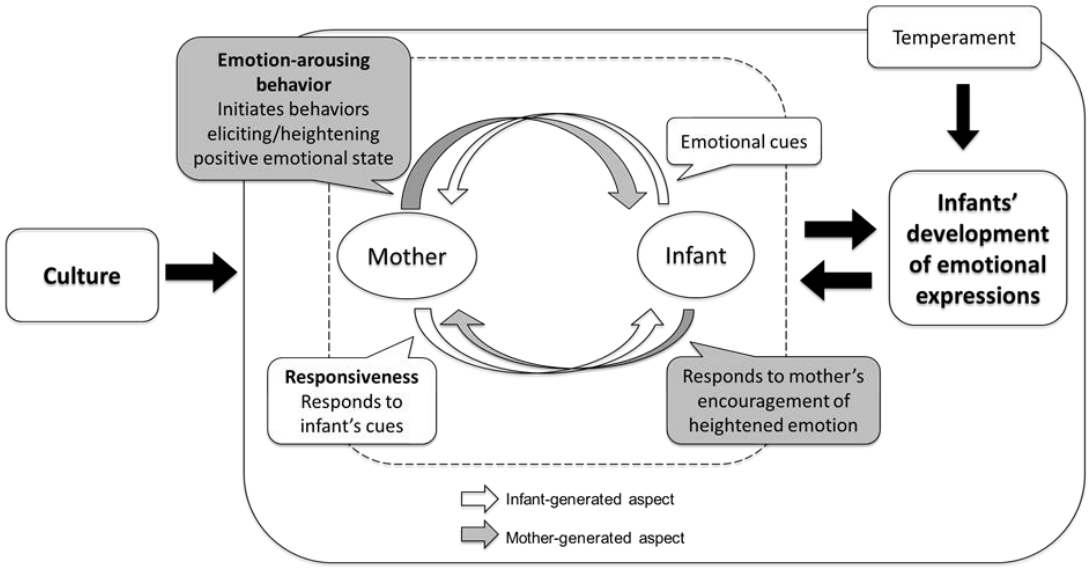

Figure 3. A new theoretical model for understanding cultural socialization of emotional expression.

A new theoretical model that reflects the current findings depicts a reciprocal influence between infants and mothers as well as the dynamic role of culture in these bi-directional relationships between parenting behaviors and infants' emotional expressions. Because culture changes mothers' perspectives on the arousal level of emotions, mothers from diverse cultures socialize their infants by responding to infants' emotional cues differently (e.g., responding in a way that either upregulates or downregulates infants' emotional expressions). In addition, infants' emotional expressions, partly influenced by temperament, affect maternal socialization behaviors differently across cultural backgrounds as culture changes mothers' views on expressing intense emotion; in turn, mothers react to infants' intense emotional expressions differently (e.g., U.S. mothers employ emotion-arousing behaviors to boost suppressed infants' intensity of emotion, while Korean mothers only use such behaviors to elicit [but not to heighten] their emotion). Being aware that temperament has the aspect that is not influenced by culture, temperament is partially culturally influenced and is therefore only partially included in the culturally influenced area of the new theoretical model.

Parents' influential roles in infants' socio-emotional development is firmly established and widely agreed upon; however, relatively less attention has been paid to reciprocal influences between infants and parents, even though it has been emphasized by previous literature dating back more than 50 years (Bell, 1968, 1979; Harper, 1975, 1981). As an initial step to investigate this complex process, researchers have suggested a focus on a child–effect perspective to balance relatively sufficient findings from a parent–effect perspective. In Bell's (1968) model of parent–offspring interaction, parents and infants both contribute to regulating the interactions within their own upper and lower limits of arousal. This dissertation contributes to the literature by adding evidence of children's effects on regulating parents' behavior within these interactions.

For example, counter to the hypothesis of the second study, mothers' more frequent use of emotion-arousing behavior was not related to upregulating infants; instead, mothers of infants who did not express positive emotion showed more emotion-arousing behavior than mothers of infants expressing positive emotions. This indicates that down-regulated infants may have affected their mothers to show more emotion-arousing behavior in an attempt to upregulate the infants. This provides a hint of evidence for a reciprocal influence between infants and mothers, which is reflected in the new theoretical model.

In addition to providing evidence of infants' effects on parents, the studies reported in this dissertation build on the idea of bidirectional regulation by showing that this process varies by culture. Both studies found culture-specific relationships between maternal behavior and infants' development of emotional expression. In the first study, a moderating effect of culture on the relationship between maternal responsiveness and infants' intensity of pleasure expression was found. Specifically, mothers showing higher responsiveness predicted infants to express more intense pleasure in the U.S. sample, while mothers showing higher responsiveness predicted infants to express less intense pleasure in the Korean sample. In the second study, infants of mothers in the United States who showed emotion-arousing behavior expressed pleasure less intensely than did infants of mothers who did not show emotion-arousing behavior, but this was not the case in the Korean sample. Thus, the strength or direction of the relationships between parenting behavior and infants' emotional expressions may differ across cultures. This implies that the socialization of expressing emotions within parent–infant interaction is not only a bidirectional process but that the goals of this process are shaped by culturally-specific meanings and values (e.g., valuing high-arousal or low-arousal positive emotions or regulating the expression of certain emotions). These findings highlight the

importance of considering the culturally-specific relationships among variables in cross-cultural studies on these topics.

Integrated Interpretation Across Two Studies

The findings from each study required integrated interpretation across both studies. In the first study, it was found that U.S. mothers responded to their infants in a way that upregulated the infants' positive emotions, while the Korean mothers responded to their infants in a way that downregulated their infants' positive emotions. The result of the first study, which focused on infant-elicited parenting behaviors, implies that mothers in each culture socialized their infants based on different cultural values toward positive emotions. By contrast, in the second study, when mother-generated parenting behaviors were the focus, Korean mothers employed more emotion-arousing behaviors than U.S. mothers did, which seems to indicate that U.S. mothers do not upregulate their infants as much as Korean mothers do. Although the finding of the second study was different from my initial hypothesis, current literature provides ways of understanding these results. Previous studies (Rothbaum, Negaoka, & Ponte, 2006; Ziehm, Trommsdorff, Heikamp, & Park, 2013) have demonstrated that Western caregivers are more likely to consider sensitivity as responding to infants' explicit cues, while Asian caregivers are more likely to regard it as anticipating infants' needs before they are expressed. Thus, U.S. mothers may upregulate their infants as long as there are expressed cues, and they seem to selectively use emotion-arousing behavior (mother-generated behavior) for upregulation only when their infants are downregulated. Conversely, Korean mothers' use of emotion-arousing behavior was not relevant to their infants' intensity of emotional expression. Korean mothers may use these behaviors because, in their cultural understanding of sensitivity, parents are responsible for taking a more directive role by predicting and addressing their infants' unexpressed needs. It

seems that what prompts Korean mothers to use emotion-arousing behaviors is their own sense of responsibility for the interaction, regardless of whether their infants are downregulated or not.

Theoretical and Practical Implications

Several implications are suggested based on these integrated interpretations of findings. Together, these studies demonstrated that whether mothers socialize their infants' emotional expressions by upregulating or downregulating their positive emotions varies, depending on which aspect of the mothers' behavior is the focus–mother-generated or infant-elicited behaviors. Notably, cultural socialization of emotion does not always appear in the same way when we consider these different aspects of parenting behaviors. Further, these different patterns between the two aspects of mothers' behaviors (infant-elicited, parent-generated) can be explained by the cultural understanding of a caregiver's role in caregiver–infant interactions and the nature of sensitivity (e.g., responsive sensitivity vs. proactive sensitivity).

Another implication is that the findings of this dissertation could inform practitioners in early childhood education and/or intervention, particularly those working to support parents in their relationships and interactions with young children. To understand how best to support families in encouraging their infants' social-emotional development, it is important for family support providers to understand the diversity of families' cultural backgrounds. In addition, for those working in infant care, understanding a child's cultural background could inform the expectations that they have of a child's emotional expressiveness as well as the kinds of interactions that the child may be accustomed to at home. Educators and interventionists need to be aware that infants' development of emotional expression reflects various cultural values, which are transmitted through parenting behaviors.

Conclusion

The current dissertation informed us about many ways in which culture influences parent–infant interactions, which were once thought to be universal and unidirectional. The findings advance our understanding by discovering the dynamic role of culture in bi-directional relationships between parenting behaviors and infants' emotional development. Future research that examines these aspects of cultural influence in diverse cultures will contribute to a better understanding of the mechanism of cultural influence on the reciprocal effect between parenting behaviors and infants' development.

REFERENCES

REFERENCES

Amankwaa, L. C., Pickler, R. H., & Boonmee, J. (2007). Maternal responsiveness in mothers of preterm infants. *Newborn and Infant Nursing Reviews, 7*(1), 25-30. doi:10.1053/j.nainr.2006.12.001

Aviezer, H., Trope, Y., & Todorov, A. (2012). Body cues, not facial expressions, discriminate between intense positive and negative emotions. *Science, 338*(6111), 1225-1229. doi:10.1126/science.1224313

Beebe, B., & Stern, D. N. (1977). Engagement-disengagement and early object experiences. In N. Freedman & S. Grand (Eds.), *Communicative structures and psychic structures* (pp. 35-55). New York, NY: Plenum Press.

Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychological Review, 75*(2), 81-95.

Bell, R. Q. (1974). Contributions of human infants to caregiving and social interaction. In M. Lewis & L. A. Rosenblum (Eds.), *The effect of the infant on its caregiver* (pp.1-19). Oxford, England: Wiley-Interscience.

Bell, R. Q. (1979). Parent, child, and reciprocal influences. *American Psychologist, 34*(10), 821-826.

Bell, S. M., & Ainsworth, M. D. S. (1972). Infant crying and maternal responsiveness. *Child Development, 43*, 1171-1190.

Bell, D. C., & Bell, L. G. (1989). Micro and macro measurement of family systems concepts. *Journal of Family Psychology, 3*(2), 137-157.

Brand, R. J., Baldwin, D. A., & Ashburn, L. A. (2002). Evidence for 'motionese': modifications in mothers' infant-directed action. *Developmental Science, 5*(1), 72-83.

Brand, R. J., & Shallcross, W. L. (2008). Infants prefer motionese to adult-directed action. *Developmental Science, 11*(6), 853-861.

Brand, R. J., Shallcross, W. L., Sabatos, M. G., & Massie, K. P. (2007). Fineg-grained analysis of motionese: Eye gaze, object exchanges, and action units in infant-versus adult-directed action. *Infancy, 11*(2), 203-214. doi:10.1111/j.1532-7078.2007.tb00223.x

Braungart, J. M., & Stifter, C. A. (1991). Regulation of negative reactivity during the strange situation: Temperament and attachment in 12-month-old infants. *Infant Behavior and Development, 14*(3), 349-364.

Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press.

Camaioni, L., & Laicardi, C. (1985). Early social games and the acquisition of language. *British Journal of Developmental Psychology, 3*(1), 31-39. doi:10.1111/j.2044-835X.1985.tb00952.x

Camras, L. A., Bakeman, R., Chen, Y., Norris, K., & Cain, T. R. (2006). Culture, ethnicity, and children's facial expressions: A study of European American, mainland Chinese, Chinese American, and adopted Chinese girls. *Emotion, 6*(1), 103-114.

Camras, L. A., Meng, Z., Ujiie, T., Dharamsi, S., Miyake, K., Oster, H., . . . Campos, J. (2002). Observing emotion in infants: facial expression, body behavior, and rater judgments of responses to an expectancy-violating event. *Emotion, 2*(2), 179-193.

Camras, L. A., Oster, H., Campos, J., Campos, R., Ujiie, T., Miyake, K., . . . Meng, Z. (1998). Production of emotional facial expressions in European American, Japanese, and Chinese infants. *Developmental Psychology, 34*(4), 616-628.

Camras, L. A., Oster, H., Campos, J. J., Campos, R., Ujiie, T., Miyake, K., ... & Zhaolan, M. (1997). Observer judgments of emotion in American, Japanese, and Chinese infants. *New Directions for Child and Adolescent Development, 1997*, 89-105.

Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. *Monographs of the Society for Research in Child Development, 59*(2/3), 228-249. doi:10.2307/1166148

Chan, K., Penner, K., Mah, J. W. T., & Johnston, C. (2010). Assessing parenting behaviors in Euro–Canadian and East Asian immigrant mothers: Limitations to observations of responsiveness. *Child and Family Behavior Therapy, 32*(2), 85-102. doi:10.1080/07317101003776423

Chong, S., Werker, J. F., Russell, J. A., & Carroll, J. M. (2003). Three facial expressions mothers direct to their infants. *Infant and Child Development: An International Journal of Research and Practice, 12*(3), 211-232.

Crawley, S. B., Rogers, P. P., Friedman, S., Iacobbo, M., Criticos, A., Richardson, L., & Thompson, M. A. (1978). Developmental changes in the structure of mother–infant play. *Developmental Psychology, 14*(1), 30-36.

Denham, S. A., Bassett, H. H., & Wyatt, T. (2007). The socialization of emotional competence. In J. Grusec & P. Hastings (Eds.), *The handbook of socialization* (pp. 614–637). New York: Guilford Press.

Dennis, T. A., Talih, M., Cole, P. M., Zahn-Waxler, C., & Mizuta, I. (2007). The Socialization of Autonomy and Relatedness: Sequential Verbal Exchanges in Japanese and U.S. Mother—Preschooler Dyads. *Journal of Cross-Cultural Psychology, 38*(6), 729-749. doi:10.1177/0022022107308993

Diener, M. L., Mangelsdorf, S. C., McHale, J. L., & Frosch, C. A. (2002). Infants' Behavioral Strategies for Emotion Regulation With Fathers and Mothers: Associations With Emotional Expressions and Attachment Quality. *Infancy, 3*(2), 153-174. doi:10.1207/S15327078IN0302_3

Doi, L. T. (1973). The Japanese patterns of communication and the concept of amae. *Quarterly Journal of Speech, 59*(2), 180-185.

Drummond, P. D., & Quah, S. H. (2001). The effect of expressing anger on cardiovascular reactivity and facial blood flow in Chinese and Caucasians. *Psychophysiology, 38*(2), 190-196.

Dunsmore, J., & Halberstadt, A. (2009). The dynamic cultural context of emotion socialization. In J. A. Mancini & K. A. Roberto (Eds.), *Pathways of human development: Explorations of change* (pp. 171-190). Lanham, MD: Lexington.

Eisenberg, N., & Fabes, R. A. (1994). Mothers' reactions to children's negative emotions: Relations to children's temperament and anger behavior. *Merrill-Palmer Quarterly, 40,* 138-156.

Ekman, P., & Friesen, W. V. (1975). *Unmasking the face: A guide to recognizing emotions from facial clues*. Englewood Cliffs, NJ: Prentice-Hall.

Farkas, C. & Vallotton, C. D. (2012). Gesture Assessment in Children. Unpublished instrument. Pontificia Universidad Catolica de Chile.

Fernald, A. (1985). Four-month-old infants prefer to listen to motherese. *Infant Behavior and Development, 8*(2), 181-195. doi:10.1016/S0163-6383(85)80005-9

Fernald, A. (1992). Meaningful melodies in mothers' speech to infants. In H. Papousek, U. Jürgens, & M. Papoušek (Eds.), *Nonverbal vocal communication: Comparative and developmental approaches* (pp. 262-282). Cambridge: Cambridge University Press.

Fernald, A. (1993). Approval and disapproval: Infant responsiveness to vocal affect in familiar and unfamiliar languages. *Child Development, 64*(3), 657-674.

Fernald, A., & O'Neill, D. K. (1993). Peekaboo across cultures: How mothers and infants play with voices, faces, and expectations. In K. MacDonald (Ed.), *Parent–child play: Descriptions and implications* (pp. 259-285). Albany, NY: SUNY Press.

Fernald, A., & Simon, T. (1984). Expanded intonation contours in mothers' speech to newborns. *Developmental Psychology, 20*(1), 104-113. doi: 10.1037/0012-1649.20.1.104

Fernald, A., Taeschner, T., Dunn, J., Papousek, M., de Boysson-Bardies, B., & Fukui, I. (1989). A cross-language study of prosodic modifications in mothers' and fathers' speech to preverbal infants. *Journal of Child Language, 16*(03), 477-501. doi:10.1017/S0305000900010679

Field, T. (1978). The three Rs of infant-adult interactions: Rhythms, repertoires, and responsitivity. *Journal of Pediatric Psychology, 3*(3), 131-136.

Field, T. (1979). Games parents play with normal and high-risk infants. *Child Psychiatry and Human Development, 10*(1), 41-48. doi:10.1007/BF01433636

Friedlmeier, W., Corapci, F., & Cole, P. M. (2011). Emotion socialization in cross-cultural perspective. *Social and Personality Psychology Compass, 5*(7), 410-427. doi:10.1111/j.1751-9004.2011.00362.x

Friedlmeier, W., & Trommsdorff, G. (1998). Japanese and German mother-child interactions in early childhood. In G. Trommsdorff,W. Friedlmeier, & H.-J. Kornadt (Eds.), *Japan in transition. Social and psychological aspects* (pp. 217-230). Lengerich, Germany: Pabst Science.

Friedlmeier, W., & Trommsdorff, G. (1999). Emotion regulation in early childhood:A cross-cultural comparison between German and Japanese toddlers. *Journal of Cross-Cultural Psychology, 30*(6), 684-711. doi:10.1177/0022022199030006002

Garside, R. B., & Klimes-Dougan, B. (2002). Socialization of discrete negative emotions: Gender differences and links with psychological distress. *Sex Roles, 47*, 115-128.

Gianino, A., & Tronick, E. Z. (1988). The mutual regulation model: The infant's self and interactive regulation coping and defense. In T. Field, P. McCabe, & N. Schneiderman (Eds.), *Stress and coping across development* (pp. 47-68). Hillsdale, NJ: Erlbaum.

Gogate, L. J., Bahrick, L. E., & Watson, J. D. (2000). A study of multimodal motherese: The role of temporal synchrony between verbal labels and gestures. *Child Development, 71*(4), 878-894.

Gondoli, D. M., & Braungart-Rieker, J. M. (1998). Constructs and processes in parental socialization of emotion. *Psychological Inquiry, 9*(4), 283-285.

Grieser, D. L., & Kuhl, P. K. (1988). Maternal speech to infants in a tonal language: Support for universal prosodic features in motherese. *Developmental Psychology, 24*(1), 14-20.

Halberstadt, A. G., & Lozada, F. T. (2011). Emotion development in infancy through the lens of culture. *Emotion Review, 3*(2), 158-168. doi:10.1177/1754073910387946

Harper, L. V. (1975). The scope of offspring effects: From caregiver to culture. *Psychological Bulletin, 82*(5), 784-801. doi:10.1037/h0077072

Harper, L. V. (1981). Offspring effects upon parents. In D. J. Gubernick & P. H. Klopfer (Eds.), *Parental care in mammals* (pp. 117-177). New York, NY: Plenum Press.

Holodynski, M. (2013). The internalization theory of emotions: A cultural historical approach to the development of emotions. *Mind, Culture, and Activity, 20*(1), 4-38.

Johnston, C., Murray, C., Hinshaw, S. P., Pelham, W. E., & Hoza, B. (2002). Responsiveness in interactions of mothers and sons with ADHD: Relations to maternal and child characteristics. *Journal of Abnormal Child Psychology, 30*, 77-88. doi: 10.1023/A:1014235200174.

Karl, D. (1995). Maternal responsiveness of socially high-risk mothers to the elicitation cues of their 7-month-old infants. *Journal of Pediatric Nursing, 10*(4), 254-263. doi:10.1016/s0882-5963(05)80022-3

Kärtner, J., Holodynski, M., & Wörmann, V. (2013). Parental ethnotheories, social practice and the culture-specific development of social smiling in infants. *Mind, Culture, and Activity, 20*(1), 79-95.

Kärtner, J., Keller, H., & Yovsi, R. D. (2010). Mother-infant interaction during the first 3 months: the emergence of culture-specific contingency patterns. *Child Development, 81*(2), 540-554. doi:10.1111/j.1467-8624.2009.01414.x

Keller, H. (2010). Linkages between the whiting model and contemporary evolutionary theory. *Journal of Cross-Cultural Psychology, 41*(4), 563-577. doi:10.1177/0022022110362573

Keller, H., Kärtner, J., Borke, J., Yovsi, R., & Kleis, A. (2005). Parenting styles and the development of the categorical self: A longitudinal study on mirror self-recognition in Cameroonian Nso and German families. *International Journal of Behavioral Development, 29*(6), 496-504. doi:10.1177/01650250500147485

Keller, H., & Otto, H. (2009). The Cultural Socialization of Emotion Regulation During Infancy. *Journal of Cross-Cultural Psychology, 40*(6), 996-1011. doi:10.1177/0022022109348576

Keller, H., Otto, H., Lamm, B., Yovsi, R. D., & Kärtner, J. (2008). The timing of verbal/vocal communications between mothers and their infants: A longitudinal cross-cultural comparison. *Infant Behavior and Development, 31*(2), 217-226. doi:10.1016/j.infbeh.2007.10.001

Keller, H., Yovsi, R., Borke, J., Kärtner, J., Jensen, H., & Papaligoura, Z. (2004). Developmental consequences of early parenting experiences: Self-recognition and self-regulation in three cultural communities. *Child Development, 75*(6), 1745-1760.

Kitzmann, K., & Howard, K. M. (2011). Emotion socialization by early childhood educators: Conceptual models from psychology. *Asia-Pacific Journal of Research in Early Childhood Education, 5*, 23-44.

Kleinsmith, A., De Silva, P. R., & Bianchi-Berthouze, N. (2006). Cross-cultural differences in recognizing affect from body posture. *Interacting with Computers, 18*(6), 1371-1389.

Klimes-Dougan, B., & Zeman, J. (2007). Introduction to the special issue of social development: Emotion socialization in childhood and adolescence. *Social Development, 16*(2), 203-209.

Kochanska, G. (2001). Emotional development in children with different attachment histories: The first three years. *Child Development, 72*(2), 474-490. doi:10.1111/1467-8624.00291

Koterba, E. A., & Iverson, J. M. (2009). Investigating motionese: The effect of infant-directed action on infants' attention and object exploration. *Infant Behavior and Development, 32*(4), 437-444. doi:10.1016/j.infbeh.2009.07.003

Lewis, M. D. (1993). Early socioemotional predictors of cognitive competency at 4 years. *Developmental Psychology, 29*(6), 1036-1045.

Malatesta, C. Z., Grigoryev, P., Lamb, C., Albin, M., & Culver, C. (1986). Emotion socialization and expressive development in preterm and full-term infants. *Child Development, 57*, 316-330. doi:10.2307/1130587

Malatesta, C. Z., & Haviland, J. M. (1982). Learning display rules: The socialization of emotion expression in infancy. *Child Development, 53*, 991-1003.

Markova G. (2018). The games infants play: Social games during early mother-infant interactions and their relationship with oxytocin. *Frontiers in Psychology, 9*(1041), 1-12. doi:10.3389/fpsyg.2018.01041

Masataka, N. (1999). Preference for infant-directed singing in 2-day-old hearing infants of deaf parents. *Developmental Psychology, 35*(4), 1001-1005.

Matas, L., Arend, R. A., & Sroufe, L. A. (1978). Continuity of adaptation in the second year: The relationship between quality of attachment and later competence. *Child Development, 49*, 547-556.

Matsumoto, D. (1993). Ethnic differences in affect intensity, emotion judgments, display rule attitudes, and self-reported emotional expression in an American sample. *Motivation and Emotion, 17*(2), 107-123. doi:10.1007/BF00995188

Mauss, I. B., & Butler, E. A. (2010). Cultural context moderates the relationship between emotion control values and cardiovascular challenge versus threat responses. *Biological Psychology, 84*(3), 521-530. doi:10.1016/j.biopsycho.2009.09.010

Mesman, J., Minter, T., Angnged, A., Cissé, I. A. H., Salali, G. D., & Migliano, A. B. (2018). Universality Without Uniformity: A Culturally Inclusive Approach to Sensitive Responsiveness in Infant Caregiving. *Child Development, 89*(3), 837-850. doi:10.1111/cdev.12795

Mesman, J., van Ijzendoorn, M., Behrens, K., Carbonell, O. A., Cárcamo, R., Cohen-Paraira, I., . . . Zreik, G. (2016). Is the ideal mother a sensitive mother? Beliefs about early childhood parenting in mothers across the globe. *International Journal of Behavioral Development, 40*(5), 385-397. doi:10.1177/0165025415594030

Mizuta, I., Zahn-Waxler, C., Cole, P. M., & Hiruma, N. (1996). A cross-cultural study of preschoolers' attachment: Security and sensitivity in Japanese and US dyads. *International Journal of Behavioral Development, 19*, 141-159.

Nelson, D. G. K., Hirsh-Pasek, K., Jusczyk, P. W., & Cassidy, K. W. (1989). How the prosodic cues in motherese might assist language learning. *Journal of Child Language, 16*(1), 55-68.

Papoušek, M., & Hwang, S.-F. C. (1991). Tone and intonation in Mandarin babytalk to presyllabic infants: Comparison with registers of adult conversation and foreign language instruction. *Applied Psycholinguistics, 12*(04), 481-504. doi:10.1017/S0142716400005889

Park, B., Tsai, J. L., Chim, L., Blevins, E., & Knutson, B. (2016). Neural evidence for cultural differences in the valuation of positive facial expressions. *Social Cognitive and Affective Neuroscience, 11*(2), 243-252. doi:10.1093/scan/nsv113

Park, H., Coello, J. A., & Lau, A. S. (2014). Child Socialization Goals in East Asian versus Western Nations from 1989 to 2010: Evidence for Social Change in Parenting. *Parenting, 14*(2), 69-91. doi:10.1080/15295192.2014.914345

Park, S.-Y., Trommsdorff, G., & Lee, E. G. (2012). Korean mothers' intuitive theories regarding emotion socialization of their children. *International Journal of Human Ecology, 13*(1), 39-56.

Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the Children's Behavior Questionnaire. *Journal of Personality Assessment, 87*(1), 102-112. doi:10.1207/s15327752jpa8701_09

Ratner, N., & Bruner, J. (1978). Games, social exchange and the acquisition of language. *Journal of Child Language., 5*(3), 391-401. doi:10.1017/S0305000900002063

Rock, A. M., Trainor, L. J., & Addison, T. L. (1999). Distinctive messages in infant-directed lullabies and play songs. *Developmental Psychology, 35*(2), 527-534.

Rothbaum, F., Nagaoka, R., & Ponte, I. C. (2006). Caregiver Sensitivity in Cultural Context: Japanese and U.S. Teachers' Beliefs About Anticipating and Responding to Children's Needs. *Journal of Research in Childhood Education, 21*(1), 23-40. doi:10.1080/02568540609594576

Rothbaum, F., & Trommsdorff, G. (2007). Do roots and wings complement or oppose one another?: The socialization of relatedness and autonomy in cultural context. In J. E. Grusec & P. Hastings (Eds.), *The handbook of socailization* (pp. 461-489). New York, NY: The Guildford Press.

Rothbaum, F. M., Weisz, J., Pott, M., Miyake, K., & Morelli, G. (2000). Attachment and culture. Security in the United States and Japan. *The American Psychologist, 55*(10), 1093-1104.

Russell, A., Mize, J., & Saebel, J. (2001). Coding the social dimensions of parent-toddler play from a vertical/horizontal perspective. In P. K. Kerig & K. M. Lindahl (Eds.), *Family observational coding systems: Resources for systemic research* (pp. 93-109). New York, NY: Psychology Press.

Sameroff, A. (1975). Transactional models in early social relations. *Human Development, 18*(1-2), 65-79.

Schore, A. N. (1994). *Affect regulation and the origin of the self: The neurobiology of emotional development*. Hillsdale, NJ: Lawrence Erlbaum.

Shenfield, T., Trehub, S. E., & Nakata, T. (2003). Maternal Singing Modulates Infant Arousal. *Psychology of Music, 31*(4), 365-375. doi:10.1177/03057356030314002

Shin, H., Park, Y.-J., Ryu, H., & Seomun, G.-A. (2008). Maternal sensitivity: a concept analysis. *Journal of Advanced Nursing, 64*(3), 304-314. doi:10.1111/j.1365-2648.2008.04814.x

Simons, C. J. R., McCluskey-Fawcett, K. A., & Papini, D. R. (1986). Theoretical and functional perspectives on the development of humor during infancy, childhood, and adolescence. In L. Nahemow, K. A. McCluskey-Fawcett, P. E. McGhee (Eds.), *Humor and aging* (pp. 53-77). San Diego, CA: Academic Press.

Snow, C. E. (1972). Mothers' speech to children learning language. *Child Development, 43*, 549-565.

Song, Q., Yang, Y., Doan, S. N., & Wang, Q. (2019). Savoring or dampening? Maternal reactions to children's positive emotions in cultural contexts. *Culture and Brain, 7*, 172-189. doi:10.1007/s40167-019-00080-3

Soto, J. A., Levenson, R. W., & Ebling, R. (2005). Cultures of moderation and expression: emotional experience, behavior, and physiology in Chinese Americans and Mexican Americans. *Emotion, 5*(2), 154-165.

Sroufe, L. A., & Wunsch, J. P. (1972). The Development of Laughter in the First Year of Life. *Child Development, 43*(4), 1326-1344. doi:10.2307/1127519

Stern, D. N. (1974a). Mother and infant at play: The dyadic interaction involving facial, vocal, and gaze behaviors. In M. Lewis & L. A. Rosenblum (Eds.), *The effect of the infant on its caregiver* (pp. 187–213). Oxford, England: Wiley-Interscience.

Stern, D. N. (1974b). The goal and structure of mother-infant play. *Journal of the American Academy of Child Psychiatry*, *13*(3), 402-421.

Stern, D. N. (1990). Joy and satisfaction in infancy. In R. A. Glick & S. Bone (Eds.), *The role of affect in motivation, development, and adaptation, Vol. 1. Pleasure beyond the pleasure principle* (pp. 13-25). New Haven, CT: Yale University Press.

Stern D. N., Beebe B., Jaffe J., & Bennett S.L. (1977) The infant's stimulus world during social interaction: A study of caregiver behaviors with particular reference to repetition and timing. In H. R. Schaffer (Ed.), *Studies in Mother–Infant Interaction* (pp. 177-202). New York, NY: Academic Press.

Stern, D. N., Spieker, S., & MacKain, K. (1982). Intonation contours as signals in maternal speech to prelinguistic infants. *Developmental Psychology*, *18*(5), 727.

Sullivan, M. W., & Lewis, M. (2003). Emotional expressions of young infants and children: A practitioner's primer. *Infants and Young Children, 16*, 120-142.

Tamis-LeMonda, C. S., Adolph, K. E., Lobo, S. A., Karasik, L. B., Ishak, S., & Dimitropoulou, K. A. (2008). When infants take mothers' advice: 18-month-olds integrate perceptual and social information to guide motor action. *Developmental Psychology, 44*(3), 734-746. doi:10.1037/0012-1649.44.3.734

Trainor, L. J. (1996). Infant preferences for infant-directed versus noninfant-directed playsongs and lullabies. *Infant Behavior and Development, 19*(1), 83-92.

Trainor, L. J., Clark, E. D., Huntley, A., & Adams, B. A. (1997). The acoustic basis of preferences for infant-directed singing. *Infant Behavior and Development, 20*(3), 383-396.

Trehub, S. E., Unyk, A. M., & Trainor, L. J. (1993). Maternal singing in cross-cultural perspective. *Infant Behavior and Development, 16*(3), 285-295. doi:10.1016/0163-6383(93)80036-8

Trommsdorff, G., & Friedlmeier, W. (1993). Control and responsiveness in Japanese and German mother-child interactions. *Early Development and Parenting, 2*(1), 65-78.

Trommsdorff, G., & Friedlmeier, W. (2010). Preschool girls' distress and mothers' sensitivity in Japan and Germany. *European Journal of Developmental Psychology, 7*(3), 350-370.

Tronick, E., Als, H., Adamson, L., Wise, S., & Brazelton, T. B. (1978). The infant's response to entrapment between contradictory messages in face-to-face interaction. *Journal of the American Academy of Child Psychiatry, 17*(1), 1-13. doi:10.1016/s0002-7138(09)62273-1

Tronick, E. Z. (1989). Emotions and emotional communication in infants. *American Psychologist, 44*(2), 112-119. doi:10.1037/0003-066X.44.2.112

Tsai, J. L., Chentsova-Dutton, Y., Freire-Bebeau, L., & Przymus, D. E. (2002). Emotional expression and physiology in European Americans and Hmong Americans. *Emotion, 2*(4), 380-397.

Tsai, J. L., Knutson, B., & Fung, H. H. (2006). Cultural variation in affect valuation. *Journal of Personality and Social Psychology, 90*(2), 288-307. doi:10.1037/0022-3514.90.2.288

Tsai, J. L., & Levenson, R. W. (1997). Cultural Influences on Emotional Responding: Chinese American and European American Dating Couples During Interpersonal Conflict. *Journal of Cross-Cultural Psychology, 28*(5), 600-625. doi:10.1177/0022022197285006

Van Hoorn, J. (1987). Games that babies and mothers play. In P. Monighan-Nourot, B. Scales, J. Van Hoorn, & M. Almy (Eds.), *Looking at children's play: A bridge between theory and practice* (pp. 38-62). New York, NY: Teachers College Press.

Waters, E., Wippman, J., & Sroufe, L. A. (1979). Attachment, positive affect, and competence in the peer group: Two studies in construct validation. *Child Development*, 821-829.

Werker, J. F., & McLeod, P. J. (1989). Infant preference for both male and female infant-directed talk: A developmental study of attentional and affective responsiveness. *Canadian Journal of Psychology/Revue canadienne de psychologie, 43*(2), 230-246. doi:10.1037/h0084224

Wormann, V., Holodynski, M., Kartner, J., & Keller, H. (2012). A cross-cultural comparison of the development of the social smile: a longitudinal study of maternal and infant imitation in 6- and 12-week-old infants. *Infant Behavior & Development, 35*(3), 335-347. doi:10.1016/j.infbeh.2012.03.002

Yogman, M. W. (1981). Games fathers and mothers play with their infants. *Infant Mental Health Journal, 2*(4), 241-248. doi:10.1002/1097-0355(198124)2:4<241::AID-IMHJ2280020406>3.0.CO;2-8

Ziehm, J., Trommsdorff, G., Heikamp, T., & Park, S. Y. (2013). German and Korean mothers' sensitivity and related parenting beliefs. *Frontiers in Psychology, 4*, 561. doi:10.3389/fpsyg.2013.00561