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Similarities and differences between western cultures: Toddler temperament and parent-child interactions in the United States (US) and Germany



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ABSTRACT

Parents play a critical role in shaping social-emotional development, particularly in early childhood; however, children's influence on their own development is equally important. Parent-child interactions, fundamental to secure attachment and social schemes, represent a critical area of social-emotional development subject to child effects associated with temperament. The present study explores these effects through a cross-cultural lens via comparisons of dyads from the United States (US) and Germany. Specifically, cross-cultural differences in toddler temperament were evaluated via the Early Childhood Behavior Questionnaire (ECBQ; Putnam et al., 2006), with cross-cultural variability in parent-child interactions examined as well, along with differences in child temperament effects on the quality of these interactions. Ratings of temperament were generally similar between the two cultures; however, US toddlers were rated higher in attention shifting, whereas German children were rated higher on soothability and perceptual sensitivity. Additionally, dyadic interactions in the US were rated as more stimulating and demonstrating greater partner engagement than those in Germany. Differential contributions of temperament to interaction quality and complexity were also observed. Higher ratings of toddler discomfort and perceptual sensitivity predicted more stimulating interactions overall in the US but not Germany. In contrast, higher ratings of toddler low-intensity pleasure predicted more stimulating interactions in Germany but not the US. Overall, the present study identifies many similarities between US and German toddlers and supports theories describing children as active agents in shaping their own development, in what appears to be a different manner across cultures.

1. Introduction

As agents of socialization, parents play a critical role in shaping social-emotional development, particularly in early childhood. Parent-child interactions are fundamental to the development of attachment security and relational schemas (Page, Wilhelm, Gamble, & Card, 2010). Individual differences in temperament are consequential to parenting and represent an important set of child effects (Ganiban, Ulbricht, Saudino, Reiss, & Neiderhiser, 2011), possibly starting *in utero* (Degani, Leibovitz, Shapiro, & Ohel, 2009; Dipietro et al., 2002). Although cross-cultural comparisons of child temperament are not uncommon in the literature (e.g., Krassner et al., 2016; Rubin et al., 2006; Slobodskaya, Gartstein, Nakagawa, & Putnam, 2012), differences in the dynamics of parent-child interactions are more rarely examined, and existing research has not considered whether or not relations between child temperament

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and the quality of interactions with parents vary across cultures. The latter should be studied given strong cultural influences on relevant aspects of the “developmental niche,” or the child-rearing context, including the extent to which parents value different temperament traits, responding to these differentially (e.g., Super & Harkness, 1986). The present study addresses this gap in research, comparing toddler temperament and parent-child interactions between the United States (US) and Germany, and examining links between toddler characteristics and parent-child exchanges, along with potential cultural moderation of these child effects.

Cross-cultural research suggests that social-emotional development varies between cultures as a function of parental socialization goals, ethnotheories, and practices, such as typical interactions with young children (Harkness, Super, & van Tijen, 2000; Super & Harkness, 1986). Cross-cultural studies have been referred to as “natural experiments” (Gartstein, Putnam, Slobodskaya, & de Weerth, 2018), as such contextual variables are not manipulated, yet differ between cultures. Importantly, many cross-cultural comparisons emphasize cultural differences to ensure that culture-specific aspects are not ascribed universal status. However, identifying cross-cultural similarities is equally essential to recognize generalizable developmental phenomena. Relatedly, although comparing vastly different countries, such as those ascribing to Eastern and Western values (e.g., Krassner et al., 2016; Rubin et al., 2006) has been informative, examining differences between cultures that bear important resemblances, such as economic and political systems (e.g., average household income level, democratic values) and access to health care (e.g., routine medical services in early childhood), are also critical. Such similarities in macrosystems may indeed contribute to largely comparable socialization goals, ethnotheories, and other aspects of the “developmental niche”. However, even in the context of such broad similarities, there are likely contrasts that translate into the child’s daily routine, including interactions with caregivers. The latter can be expected, given the fact that even Western industrialized countries vary with respect to the manner in which the balance between pursuits of individual goals and importance of the communal agenda is struck as a function of geo-political forces and historic developments. An emphasis on individual freedom of choice in the US translates into an emphasis on autonomy in socialization practices, downplaying the importance of interdependence (Kagitcibasi, 2005). In Germany, a higher value is placed on interdependence (Fuchs, 2000), relative to the US.

Similarities and differences in value systems between these two countries are also reflected in Hofstede’s cultural orientation system, of which individualism/collectivism is the most widely investigated, and has been linked with child temperament and aspects of the “developmental niche” (Gartstein & Putnam, 2018). Most relevant to this study, German culture is considered more collectivistic compared to the US (Hofstede, 2001). Triandis (2001) described the central feature of individualism as a tendency to give priority to personal interests, value independence, emotional detachment, and personal achievement. In contrast, collectivistic cultures value interdependence, emotional closeness, group achievement, and cooperation. Conceptualizing interdependence and autonomy/independence on a continuum, cultural priorities have been described as differing in degree (Spiro, 1993), particularly in comparisons of countries that share many similarities, like Germany and the US. According to Bornstein (2012), cultural values are inherently embedded in parent-child interactions. For example, an emphasis on social affiliation may lead mother-child dyads to engage in socially-focused play that provides ample opportunities for shared attention between the mother and child. Likewise, individualistic or independent cultural values could translate into mothers acting more didactically and offering richer environments, to foster their child’s independent explorations. To the extent that children also contribute to the dynamics of dyadic interactions, their temperament attributes play a role, which may be more or less prominent depending on cultural factors related to autonomy/interdependence considerations, and how these translate into parental accommodation or lack thereof with respect to child individual differences. In this study, we will consider whether associations between child temperament and parent-child interactions are uniform or vary between the US and Germany.

Multiple definitions of temperament have been proposed, with Rothbart’s psychobiological model emerging as most prominent at this time, defining temperament as “constitutional differences in reactivity and self-regulation”, wherein “constitutional” refers to the “relatively enduring biological makeup of the organism influenced over time by heredity, maturation, and experience” (Rothbart & Derryberry, 1981). Although reliance on over-arching temperament factors that represent composites of multiple underlying scales is common in the literature, fine-grained dimensions reflecting different facets of reactivity and regulation have demonstrated varied predictive relations with important outcomes, such as internalizing and externalizing difficulties (Gartstein, Putnam, & Rothbart, 2012; Muhtadie, Zhou, Eisenberg, & Wang, 2013; Scheper et al., 2017), contributed differentially to temperament typologies (Gartstein et al., 2017), and were shown to have developmental trajectories that largely differed from the overarching factors (Gartstein & Hancock, 2019). These fine-grained distinctions should thus be studied more closely, especially in the cross-cultural context, as differences between cultures observed at this narrowly-defined level are not uniformly consistent with results obtained at the broad factor level (e.g., Krassner et al., 2016; Slobodskaya et al., 2012; Sung, Beijers, Gartstein, de Weerth, & Putnam, 2015).

The most relevant cross-cultural temperament literature with respect to the present study addresses such fine-grained comparisons of children from European nations and the US. For example, US infants received higher ratings on vocal reactivity and activity level than babies from the Netherlands, with Dutch children scoring higher on smiling and laughter (Sung et al., 2015). Additionally, in a comparison of US and Italian toddlers, children from the US were rated higher in low-intensity pleasure but lower in cuddliness relative to their Italian counterparts (Montirosso, Cozzi, Putnam, Gartstein, & Borgatti, 2011). Despite its focus on overarching factors, a recent meta-analysis by Putnam and Gartstein (2017) is relevant given the number of cultures considered across different geographic regions. Importantly, lower overall negative affect (i.e., distress proneness) and higher attention-based regulatory capacity were reported for northern Europe, relative to other regions, including the US. Prior efforts have not considered cross-cultural differences in parent-child interaction dynamics alongside temperament, nor the links between the two sets of variables in the context of a child effects model considered in this study.

Sensitivity/responsiveness, generally operationalized to include both accurate encoding of infant cues and appropriate responses, and a related construct, synchrony/reciprocity – a dyad’s ability to coordinate their interactions in a form of a “dance” – represent the

most widely studied interactional dynamics in early childhood, implicated in the development of attachment security and behavior problems (Ainsworth, 1979; Im-Bolter, Anam, & Cohen, 2014). Interactions marked by a more positive emotional tone and providing optimal levels of stimulation have also been linked with secure attachment (Ainsworth, Blehar, Waters, & Everett Wall, 1978; Belsky, Rovine, & Taylor, 1984; De Wolff & van Ijzendoorn, 1997; Egeland & Farber, 1984), and are subject to temperament-related child effects (van den Boom, 1994; van den Boom & Hoeksma, 1994), particularly in the cross-cultural context. Changes in several dimensions of parent-child interactions, including sensitivity/responsiveness and synchrony/reciprocity were predicted by temperament attributes (regulatory capacity/orienting) in infancy (Gartstein et al., 2017), and similar relations with other interactional dynamics warrant further study. Just as parents are able to transmit values and influence the socioemotional development of their children, children exert their own influence into dynamics within their family. That is, children can influence the manner in which their parents interact with them, and in doing so, can influence their own development (e.g., Scarr, 1992). For example, van den Boom and Hoeksma (1994) found that, in comparison to mothers of non-irritable infants, mothers whose infants were frequently fussy became less involved with, and responsive to, their babies over the first several months of life. Ganiban et al. (2011) found that adolescents who displayed more overall negative emotionality and sociability evoked more negativity from their parents.

Virtually the entire cross-cultural parent-child interaction literature has focused on differences in maternal sensitivity/responsiveness. For example, Posada et al. (2016) compared maternal sensitivity/responsiveness across dyads from the US, Peru, Columbia, and Mexico, reporting that US mothers were significantly more sensitive to their children than caregivers from the other cultures. Posada et al. (2002) also found that a Close-Intimate domain (e.g., mother displays affection by touching) category emerged for US, but not for Columbian mothers, in their interactions with infants. Comparing dyads from the US, France, and Japan, Bornstein et al. (1992) noted that relative levels of maternal sensitivity remained consistent between cultures, whereas expression of sensitivity in the form of responsiveness to gaze or vocalizations varied. Specifically, US mothers were more likely to direct their children to extra-dyadic activities throughout the course of play, whereas Japanese mothers preferred play which emphasized the dyadic interaction itself. Additionally, Japanese mothers appeared more responsive to their babies' social looking. Most relevant to the present study, Grossman, Grossman, Spangler, Suess, and Unzner (1985) compared mothers from Germany and the US, noting significant differences that favored US caregivers in terms of sensitivity/responsiveness. Specifically, the German mothers were observed to behave in a less affectionate manner with their infants, holding them for shorter periods of time, and their handling of the infant was viewed as interfering more frequently, compared to the US mothers. The present study extends the existing literature by comparing parent-child interactions considering five domains shown to vary with temperament inputs (e.g., Gartstein et al., 2017): sensitivity/responsiveness, synchrony/reciprocity, tempo (i.e., speed or pace of the interaction), intensity (i.e., volume, complexity, and exuberance), and tone (i.e., affect valence of an interaction on a spectrum of negative to positive affect). These domains were subjected to data reduction as significant intercorrelations were anticipated, and to minimize the number of statistical tests. Specifically, correlations between these dimensions were used to guide the development of parent-child interaction composite variables.

Cross-cultural differences in how child temperament profiles are associated with the quality of parent-child interactions can also be anticipated. First, considerable differences in child temperament profiles have been reported even for similar Western and relatively individualistic cultures (e.g., Sung et al., 2015). Second, the more limited literature addressing cross-cultural differences in parent-child interactions suggests these vary as well, at least in terms of sensitivity/responsiveness. In addition, there is some indication that links between temperament and aspects of parenting may differ cross-culturally. For instance, Chen et al. (1998) found Canadian mothers to be more punitive and less supportive of their children's inhibited behaviors, in comparison to Chinese mothers, who were accepting and even encouraging of their children's inhibition. More recently, Prokasky, Lecannelier, Sánchez-Pérez, and Gartstein (2018) reported that, at bedtime, parents in Chile, the US, the Netherlands, and Romania were more likely to stay with their children if they were rated high in negative emotionality but found no such relations in 10 other cultures compared. Given that these aspects of parenting were differentially related to temperament across cultures, we expect the manner in which other parent-child interaction factors and child individual differences relate vary by culture as well – a possibility examined in this study for US and Germany.

1.1. Goals and hypotheses

An initial goal of the present study was to examine similarities and differences in toddler social-emotional development in Germany and the US. To address this goal, temperament attributes in both countries were analyzed in terms of mean levels of fine-grained scales. In this study, we focus exclusively on the fine-grained dimensions as these provide a richer and more nuanced profile of individual difference. As prior cross-cultural comparisons were often limited to the factor level, we were guided by the latter in the formulation of hypotheses for this study. That is, we anticipated higher levels of discomfort, fear, motor activation, sadness, perceptual sensitivity, shyness, frustration, and soothability, fine grained attributes associated with negative emotionality (the latter in the negative direction); and lower levels of inhibitory control, attention shifting, low-intensity pleasure, cuddliness, and attention focusing, aspects of effortful control (attention-based regulation), for the US sample, in accordance with previously observed differences between the US and northern European children (e.g., Gartstein, Slobodskaya, Zylicz, Gosztyla, & Nakagawa, 2010; Putnam & Gartstein, 2017; Sung et al., 2015). Expectations regarding activity level, high-intensity pleasure, positive anticipation, and sociability were less certain, given the inconsistency of findings comparing youth from northern Europe and the US (Putnam & Gartstein, 2017), and these analyses should be considered largely exploratory.

Second, parent-child interactions were compared for German and US samples based on composites including sensitivity/responsiveness, synchrony/reciprocity, tempo, intensity, and emotional tone. Despite a limited basis for a-priori hypotheses concerning parent-child interactions, existing studies suggest these vary across cultures, with US mothers expected to be more sensitive/

Table 1
Sample Demographics.

Demographics	US <i>M</i> (SD)	German <i>M</i> (SD)
Maternal age (years)	33.96 (5.78)	35.99 (6.59)
Mother's years in school	17.48* (2.15)	16.33* (3.08)
Maternal socioeconomic status	47.76 (25.46)	58.29 (27.19)
Child age (months)	24.87 (4.61)	27.41 (5.40)

Note: Statistical comparisons made using independent samples t-tests.

* $p < .05$.

responsive, and also stimulating, for example directing children toward engagement in toy play (i.e., extradyadic activities) rather than emphasizing physical/emotional closeness. Posada et al. (2002) and Grossman et al. (1985) results indicated greater affection expressed by US mothers, thus higher levels of positive emotional tone were anticipated in US dyadic interactions with toddlers, compared to the German counterparts.

Finally, culture was considered as a moderator of associations between temperament and parent-child interaction factors. That is, we examined the extent to which associations between temperament and interactional dynamics varied as a function of culture (i.e., for US and German dyads). We anticipated significant moderation, yet evidence supporting specific a-priori hypotheses regarding temperament*culture interactions was sparse. The work of Chen et al. (1998) and Prokasky et al. (2018), however, suggests that higher levels of traits associated with negative emotionality may contribute to more sensitive/responsive and affectively positive exchanges in German dyads, and interactions which are less conducive to child engagement in the US. It should be noted that although these data were analyzed and interpreted in the context of the conceptual child-effects model, available correlational/cross-sectional information does not permit firm conclusions about the direction of effects.

2. Methods

2.1. Participants

To ensure that our samples reflected each culture, participating parents from each site had to represent at least the third generation. Samples in the US and Germany (see Table 1) represent educated professionals with average to above-average incomes and autonomy in their work, meeting middle to upper middle-class (Thompson & Hickey, 2005) criteria. All participants from both countries identified as Caucasian. The German sample consisted of 23 female and 26 male participants, and the US sample consisted of 22 female and 24 male participants. Among US participants, 44 mothers reported being married and 2 reported living with their child's father while not married. For the German sample, 44 mothers reported being married and 5 reported living with their child's father. Significant differences in mean years of education of the mothers emerged, with the German sample attaining lower levels relative to the US. This likely occurred as a function of differences in education systems, with Germany employing a dual system of gaining a profession through either a university diploma after obtaining an equivalent of a high school degree, or pursuing vocational education that involves fewer years of study in highly specialized trade training, yet affords a relatively high economic standing, which was comparable between the two samples.

The US sample originally included 50 participants from the inland Northwest region of the US, with mothers of 18- to 36-month-old children asked to participate in this research. Interested families were recruited by telephone from birth announcements published in local newspapers. Flyers were posted in childcare centers and other locations frequented by mothers of toddlers, such as community centers, libraries and pediatrician offices. In addition, parents expressing interest in the study after being contacted by mail based on a commercial listing were told about the study and asked to take part if their child was between 18 and 36 months of age. Mothers were also recruited by word of mouth in the community, and through mothers who have taken part in this study. Of the 59 interested families, 9 declined to participate, citing one of the caregivers' lack of enthusiasm or inability to accommodate the approximately 2-h time commitment. Of the 50 US participants who agreed to partake in the study, 46 returned questionnaires and 43 completed parent-child interaction observations.

The German sample ($N = 54$ originally) was primarily recruited through personal contacts with family and friends of the investigator, and word of mouth through other participants in several German cities (Munich, Stuttgart, Düsseldorf, Paderborn, and Muenster). Teachers in two preschool centers were approached in Stuttgart and asked to distribute flyers. All potential participants were subsequently contacted by telephone or e-mail and informed about the study. Of 56 potential participants, one mother declined due to discomfort with the home visit and video-recording, and one mother declined because of difficulties in scheduling. Of the original 54 participants, 49 completed questionnaires and 47 completed parent-child interaction observations.

Some observational data were missing for several different reasons. For the US participants, one family moved away between the time that the temperament information was obtained and the home observation could take place, and technical difficulties with video-recording were encountered on two occasions. For the German sample, two of the families providing temperament data could not be observed because of the time constraints for the German portion of data collection, and the experimenter not being available at their preferred home visit time. For families who initially indicated an interest in participation but subsequently declined to take part, the lack of time necessary to complete the study was cited as the primary reason. Individuals who withdrew from the study did not

Table 2
Early Childhood Behavior Questionnaire Scale Descriptions.

Scale Label	Definition
Activity Level	Level (rate and intensity) of gross motor activity, including rate and extent of locomotion.
Attention Focusing	Focusing Sustained duration of orienting on an object of attention; resisting distraction.
Attention Shifting	The ability to transfer attentional focus from one activity/task to another.
Cuddliness	Child's expression of enjoyment in and molding of the body to being held by a caregiver.
Discomfort	Amount of negative affect related to sensory qualities of stimulation.
Fear	Negative affect related to anticipated pain, distress, sudden events and/or potentially threatening situations.
Frustration	Negative affect related to interruption of ongoing tasks or goal blocking.
High-Intensity Pleasure	Pleasure or enjoyment related to situations involving high intensity, rate, complexity, novelty and incongruity.
Impulsivity	Speed of response initiation.
Inhibitory Control	The capacity to stop, moderate, or refrain from a behavior under instruction.
Low-Intensity Pleasure	Pleasure or enjoyment related to situations involving low intensity, rate, complexity, novelty and incongruity.
Motor Activation	Repetitive small-motor movements; fidgeting.
Perceptual Sensitivity	Detection of slight, low intensity stimuli from the external environment.
Positive Anticipation	Excitement about expected pleasurable activities.
Sadness	Tearfulness or lowered mood related to suffering, disappointment, or loss.
Shyness	Slow or inhibited approach and/or discomfort in social situations involving novelty or uncertainty.
Sociability	Seeking and taking pleasure in interactions with others.
Soothability	Rate of recovery from peak distress, excitement, or general arousal.

statistically differ from those who completed the study on any variables considered in this study.

2.2. Procedure

Participants were mailed a questionnaire packet containing an informed consent, demographic and temperament questionnaires. Completed materials were collected during subsequent home visits, wherein participating dyads (i.e., mothers and toddlers) were video-recorded during a 10-minute free-play sequence, unstructured with respect to choices regarding toy(s)/interaction(s). Questionnaires were translated by the first author, a native German speaker, and back translated by two bilingual German-English speakers, one of whom was a child psychologist, to identify discrepancies between the forward and back translation, as recommended for cross-cultural research (Peña, 2007).

2.3. Measurement instruments

The Early Childhood Behavior Questionnaire (ECBQ; Putnam, Gartstein, & Rothbart, 2006) is a parent-report child temperament instrument designed for use between 18 and 36 months of age. Factor analytic work with this measure resulted in the identification of three overarching factors encompassing 18 fine-grained composites or scales, in turn based on 201 items. The items are rated on a 7-point Likert scale with responses ranging from "Never" to "Always." Satisfactory inter-rater agreement (r s ranging from .33 to .79) and test-retest reliability ($r = .32-.79$) have been reported for the ECBQ (Putnam et al., 2006; see Table 2 for scale definitions).

For the present study, the German version of the ECBQ demonstrated satisfactory internal consistency (i.e., subscale α 's ranged between .61 and .84). Internal consistency of the ECBQ for the US sample reached satisfactory levels (i.e., subscale α 's ranged between 0.62 and .88) for all subscales except impulsivity ($\alpha = .44$) and activity level ($\alpha = .56$), which could not be improved by eliminating problematic items. Thus, the latter scales were not considered in further analyses. Two items (one from the discomfort scale, one from fear scale) were eliminated from their respective scales in both countries in order to maximize internal consistency (i.e., because these items demonstrated low item-total correlations). All retained scales were computed in an identical manner across German and US samples.

Parent-Child Interaction indices were derived from video-recorded observations using an established coding scheme (Gartstein, Crawford, & Robertson, 2008; Gartstein, Hancock, & Iverson, 2018). Parents were instructed to "play with your child as you normally would," selecting a location that would facilitate play interactions and limit distractions (e.g., other children, pets). Interactions were confined to a single room to accommodate video-recording, with parents using their child's toys in play. Ratings were provided for domains including: (1) maternal sensitivity/responsiveness; (2) synchrony/ reciprocity of the dyad; (3) tempo of the interactions; (4) intensity of exchange; and (5) emotional tone of the episode. A global rating was assigned to each interactional domain, using a 7-point Likert scale with one representing a low level of an attribute or a negative extreme of a continuum, and 7 reflecting a high level or a positive extreme. Table 3 provides descriptive anchors for the operational definitions of each dimension. Inter-rater reliability ($ICCs > .60$) was established for this observation coding scheme, as previously described (Gartstein et al., 2008; Gartstein, Hancock et al. 2018; Gartstein, Putnam et al., 2018). In order to reduce the number of analyses and to address inter-relations between the parent-child interaction indices (see supplemental correlation matrix), two composite scores were generated by averaging component scales. The first, "engagement," was calculated as the mean of sensitivity/responsiveness, synchrony/reciprocity, and tone ratings (mean $r = .58$). The second, "stimulation," was comprised of intensity and tempo ratings ($r = .62$). In addition to being significantly correlated, combined scales present conceptual overlap. Namely, the engagement composite speaks to the extent to which interactions are structured in a manner conducive to the engagement of the child, whereas stimulation reflects the relative level of energy

Table 3
Parent-Child Interaction Coding Scheme.

Scales	Codes/Descriptions		
	1	4	7
Sensitivity/ responsiveness	Extremely non-responsive/sensitive: lacks genuine empathy and interest in infant. Parent does not a) initiate play; b) reinforce infant activities; c) draw infant into joint activity; d) give encouragement; e) allow infant independent activity; f) effectively extends infant activity	Moderately responsive/ sensitive: moderate empathy and interest in infant. Parent periodically a) initiates play b) reinforces infant activities; c) draws infant into joint activity; d) gives encouragement; e) allows infant independent activity; f) effectively extends infant activity	Extremely responsive/ sensitive: prompt, regular, genuine empathy and interest in infant. Parent consistently a) initiates play; b) reinforces infant activities; c) draws infant into joint activity; d) gives encouragement; e) allows infant independent activity; f) effectively extends infant activity
Synchrony/ reciprocity	Extremely asynchronous/ non-reciprocal: a) low frequency of simultaneous movement; b) low tempo similarity; c) low coordination/ smoothness	Moderately synchronous/ reciprocal: a) moderate frequency of simultaneous movement; b) moderate tempo similarity; c) moderate coordination/ smoothness	Extremely synchronous/ reciprocal: a) high frequency of simultaneous movement; b) high tempo similarity; c) high coordination/ smoothness
Tempo	Extremely slow paced: a) low frequency of changing objects/activity; b) low levels of physical activation; c) low levels of verbal/vocal expression	Moderately paced: a) moderate frequency of changing objects/activity; b) moderate levels of physical activation; c) moderate levels of verbal expression	Extremely fast paced: a) high frequency of changing objects/activity; b) high levels of physical activation; c) high levels of verbal/vocal expression
Intensity	Extremely low intensity: a) very quiet verbal/vocal exchange; b) low levels of complexity; c) low parental exuberance	Moderate intensity: a) moderately audible verbal/vocal exchange; b) moderate complexity; c) moderate parental exuberance	Extremely high intensity: a) very loud verbal/vocal exchange; b) high levels of complexity; c) high parental exuberance
Emotional tone	Extremely negative emotional tone: a) frequent critical/ negative comments; b) frequent expressions of distress; c) frequent negative physical displays	Neutral emotional tone: a) mostly neutral verbal exchanges; b) few, if any, expressions of affect; c) few, if any, physical displays of affect	Extremely positive emotional tone: a) frequent enthusiastic/positive comments; b) frequent expressions of positive emotion/joy/pleasure; c) frequent positive physical displays

Note. All coding scales based on 7-point Likert Scales (1–7).

and activation within the play exchanges. Thus, engagement has been defined as the extent to which parents structure interactions in a sensitive manner, conducive to reciprocal exchanges and a positive emotional tone. On the other hand, stimulation involves the pace and vigor of interactions with children.

A demographic questionnaire was used to ascertain marital status, ethnicity, and maternal age. Sufficient information was obtained concerning employment and job responsibilities to assign a socio-economic status (SES) score corresponding to occupational prestige (Nakao & Treas, 1992). This instrument and the SES coding scheme have been previously used in cross-cultural research (Montirosso et al., 2011; Sung et al., 2015).

3. Results

3.1. Mean differences in temperament

Distribution statistics are provided in Table 4. To address the first research question regarding similarities and differences in temperament between the two cultures, mean scores in the 16 fine-grained indicators were compared for the German and US samples using ANCOVAs controlling for child age and gender (see Table 5). Child age and gender were included as covariates to maintain consistency with the existing literature, yet will not be discussed as these are not the focus of this study.¹

A number of temperament scales did not differ between the US and Germany, indicating some similarity in reactivity and regulation for children from these two cultures, alongside notable differences. Significant differences emerged for perceptual sensitivity and soothability, with German toddlers rated higher on both. In addition, US toddlers were rated higher in attention shifting (Fig. 1).

3.2. Parent-child interaction

Parent-Child interaction dynamics were compared relying on the same analytic scheme (see Table 6 and Fig. 2). US dyads were rated higher in both engagement and stimulation.

¹ Analyses were also conducted with maternal education as a covariate, which diminished the value of three F-statistics below the significance threshold, due to lowering statistical power. Given that maternal education was not significantly correlated with any variables of interest for the overall sample, we present analyses with only age and gender as covariates.

Table 4
Distribution statistics for temperament and parent-child interaction variables.

	United States				Germany			
	M(SD)	Range	Skew	Kurtosis	M(SD)	Range	Skew	Kurtosis
High-Intensity Pleasure	4.72 (1.02)	2.67-6.83	.17	2.61	4.59 (.89)	2.75-6.08	-.29	2.30
Positive Anticipation	4.73 (1.04)	2.18-6.55	-.67	3.01	4.68 (1.10)	1.36-6.36	-.94	3.96
Sociability	4.89 (1.21)	1.75-7.00	-.50	2.62	5.25 (1.18)	.63-6.63	-1.78	7.25
Discomfort	1.86 (.61)	.90-3.80	.70	3.56	2.09 (.74)	.80-3.90	.43	2.47
Fear	2.15 (.62)	1.00-3.45	.23	2.46	2.22 (.81)	.73-3.55	-.02	1.81
Frustration	3.56 (.93)	1.83-5.67	.14	2.47	3.39 (.90)	1.41-5.58	.18	2.96
Motor Activation	1.74 (.61)	.91-3.55	.90	3.48	1.89 (.68)	.45-4.09	1.02	4.72
Perceptual Sensitivity	3.51 (.88)	1.92-5.42	.29	2.54	4.06 (1.13)	1.08-6.33	-.28	3.00
Sadness	2.80 (1.05)	1.17-6.00	1.14	4.77	2.49 (.90)	.92-4.58	.24	2.30
Shyness	3.21 (1.03)	1.67-6.08	.67	2.76	3.07 (.88)	1.33-4.75	-.06	2.40
Soothability	5.37 (.85)	2.00-6.78	-1.68	7.08	5.66 (.75)	4.11-7.00	-.36	2.31
Attention Focusing	4.51 (.78)	3.00-6.50	.00	2.65	4.68 (.79)	2.75-6.08	-.46	2.72
Attention Shifting	4.41 (.74)	2.75-5.67	-.56	2.50	4.00 (.81)	1.83-5.67	.02	3.06
Cuddliness	5.16 (.86)	2.67-6.67	-1.02	3.87	5.47 (.68)	4.08-6.67	-.40	2.33
Inhibitory Control	3.81 (1.05)	1.58-5.92	.10	2.64	3.82-.93	2.17-5.92	.00	2.30
Low-Intensity Pleasure	5.09 (.83)	2.73-6.45	-.62	3.06	4.86 (1.00)	2.18-6.91	-.28	3.08
Sensitivity/Responsiveness	5.86 (.89)	3.00-7.00	-.55	3.64	5.51 (1.12)	3.00-7.00	-.26	2.35
Synchrony/Reciprocity	4.95 (1.19)	2.00-7.00	-.16	2.55	4.47 (1.35)	2.00-7.00	-.31	2.16
Tempo	4.19 (1.42)	2.00-7.00	-.03	1.87	3.28-.99	1.00-5.00	-.17	2.74
Intensity	4.70 (1.23)	2.00-7.00	-.11	2.44	4.04 (1.14)	2.00-7.00	.36	3.39
Tone	5.56 (.91)	3.00-7.00	-.37	3.18	5.09 (1.00)	3.00-7.00	-.04	2.90
Engagement	5.46 (.82)	3.33-7.00	-.30	2.70	5.02 (.98)	2.67-6.67	-.41	2.47
Stimulation	4.44 (1.22)	2.00-7.00	-.01	2.21	3.66 (.91)	2.00-6.00	.37	3.30

Table 5
Analysis of covariance results for temperament ratings.

	Culture (F)	Child Age (F)	Child Gender (F)
High-Intensity Pleasure	0.42	0.00	0.01
Positive Anticipation	1.07	9.59**	0.29
Sociability	1.11	1.98	0.59
Discomfort	1.78	2.30	6.98 [†]
Fear	0.08	0.47	1.95
Frustration	1.13	0.59	1.31
Motor Activation	0.95	0.12	0.02
Perceptual Sensitivity	4.57 [†]	3.59	2.36
Sadness	3.19	1.09	0.20
Shyness	0.75	0.64	1.87
Soothability	4.43 [†]	2.35	0.13
Attention Focusing	0.23	4.84 [†]	0.58
Attention Shifting	8.70**	3.39	0.31
Cuddliness	1.78	5.61 [†]	0.01
Inhibitory Control	0.24	5.77 [†]	0.49
Low-Intensity Pleasure	2.71	3.09	0.65

Note: For all analyses, $df = 1,91$. US $n = 46$, German $n = 49$.

* $p < .05$.

** $p < .01$.

3.3. Child effects and Cultural Moderation

Regression models were estimated using temperament*culture interaction terms, controlling for child age and gender² in order to address associations between toddler temperament at the fine-grained level and parent-child interactions, as well as possible moderation effects of culture on these relations. Tables 7 and 8 summarize regressions models with at least one significant main effect for temperament and/or culture. Culture*temperament interactions were significant for discomfort and perceptual sensitivity in analyses predicting effective engagement. For stimulation, significant interactions emerged for sociability and low-intensity pleasure.

Follow-up regressions were conducted separately for each culture in order to discern the nature of differences reflected in the significant temperament*culture interaction effects. Of the four interaction terms significant in the initial regression models (i.e.,

² Analyses were also conducted with maternal education as a covariate, which did not alter the significance of any regression coefficients.

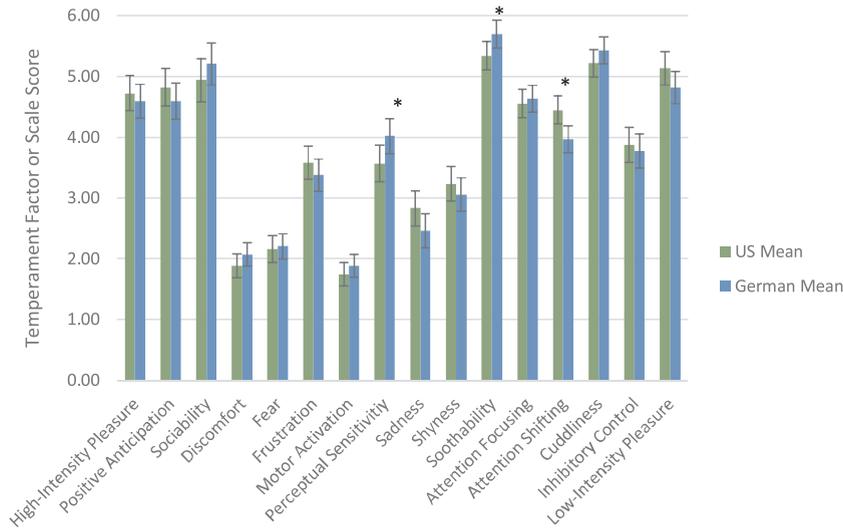


Fig. 1. Marginal means for US and German parent ratings of toddler temperament.

Table 6
Analysis of covariance results for parent-child interactions.

	Culture (<i>F</i>)	Child Age (<i>F</i>)	Child Gender (<i>F</i>)
Engagement	4.49*	0.11	3.00
Stimulation	16.23**	3.67	7.88**

Note: For all analyses, *df* = 1,86. US *n* = 43, German *n* = 47.

* *p* < .05.

** *p* < .01.

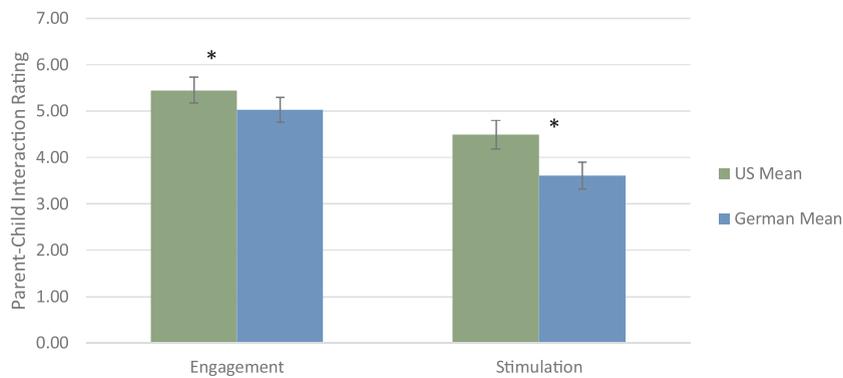


Fig. 2. Marginal Means for US and German Parent-Child Interactions.

Table 7
Standardized coefficients for regression models predicting interactional engagement.

	Discomfort	Motor Activation	Perceptual Sensitivity	Low-Intensity Pleasure	Sociability
Age β	-.01	-.04	-.02	-.06	.07
Gender β	.43	.45*	.36	.40	.38
Culture β	-.43*	-.41	-.41**	-.44*	-.43*
Temperament β	-.32	-.34*	-.35	-.19	-.18
Temperament X Culture β	.46*	.30	.56*	.38	.33

F (*df* = 5, 84).

Table 8
Standardized coefficients for regression models predicting interactional stimulation.

	High-Intensity Pleasure	Positive Anticipation	Sociability	Motor Activation	Perceptual Sensitivity	Sadness	Low-Intensity Pleasure
Age β	.19	.17	.16	.18	.18	.16	.16
Gender β	.28**	.27**	.29**	.29**	.28**	.27**	.29**
Culture β	-.78*	-.77*	-.73*	-.79*	-.77*	-.65	-.78**
Temperament β	-.12	-.14	.30**	-.02	-.18	.35**	-.29
Temperament X Culture β	.25	.26	.39*	.19	.37	-.09	.52**

F (df = 5, 84).

indicating that slopes between the US and Germany were statistically different from one another), three demonstrated significant effects in follow-up regressions, such that not only did the slopes differ between cultures, but these slopes differed from zero in at least one of the cultures (Fig. 3A – C). Higher ratings of discomfort were associated with lower ratings of engagement in the US ($\beta = -.34$, $p = .035$), but not German dyads ($\beta = .23$, $p = .145$). Similarly, greater perceptual sensitivity was related to lower engagement in the US ($\beta = -.38$, $p = .022$) but not Germany ($\beta = .24$, $p = .103$). Finally, higher toddler low-intensity pleasure was associated with higher stimulation ratings in Germany ($\beta = .34$, $p = .012$), whereas this temperament dimension was not significantly related to the quality of parent-child exchanges for US dyads ($\beta = -.21$, $p = .145$). Although the interaction was significant when predicting stimulation in the regression model with sociability, this effect did not reach statistical significance when conducted for the US ($\beta = -.26$, $p = .064$) or Germany ($\beta = .11$, $p = .437$). Thus, although the moderating effects of sociability was statistically different between the cultures, it did not produce a reliable change in slope for either country.

4. Discussion

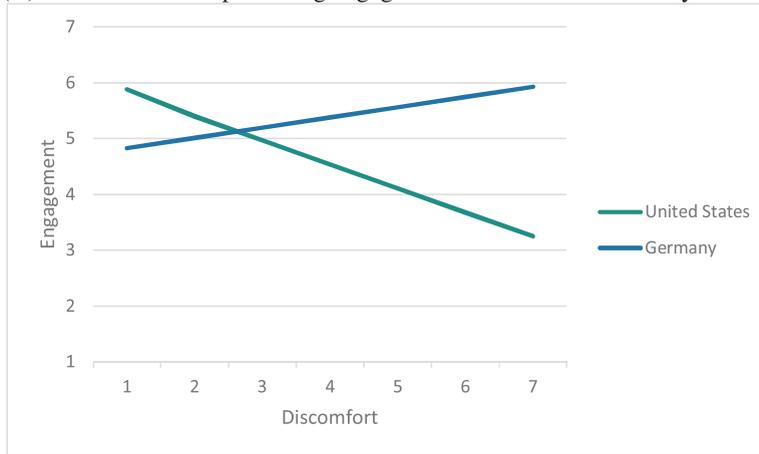
Results of our study indicate many similarities in regards to fine-grained temperament attributes for US and German children, with observed cross-cultural differences relatively circumscribed. However, both composites of parenting demonstrated significant differences between these cultures. Importantly, this study set out to explore cultural moderation of child effects and identified multiple examples of relations between child temperament and interactional dynamics that differed between US and Germany. Cultural moderation of temperament has been examined with respect to the prediction of behavior problems (Gartstein, Slobodskaya, Kirchhoff, & Putnam, 2013), and this study is the first to consider how relations between child temperament and parent-child interactions differ across cultures.

Perhaps not surprising, given a common Western orientation shared by Germany and the US, ratings of toddler temperament were not statistically significantly different on 13 of the 16 considered attributes. Overall, these comparable temperament profiles are likely a function of multiple similarities among German and US cultures. As noted in the introduction, there are many parallels across economic and political systems and access to health care for US and Germany. These macrosystem similarities likely contribute to some overlap in socialization goals and ethnotheories, expected to shape development of child reactivity and regulation via daily routine, structured consistently with shared values and expectations (Super & Harkness, 1986). Bronfenbrenner's Ecological Systems Theory (Bronfenbrenner & Evans, 2000; Bronfenbrenner, 1979) anticipates such effects insofar as cultural values, institutions, and customs, which are to a large extent comparable in the US and Germany due to shared aspects of political and economic systems, are expected to impact family functioning and ultimately child development, social-emotional development in particular. Our findings indicative of German-US similarities should be considered alongside of the differences noted below, recognizing the risk of interpreting null findings, especially in light of our sample size.

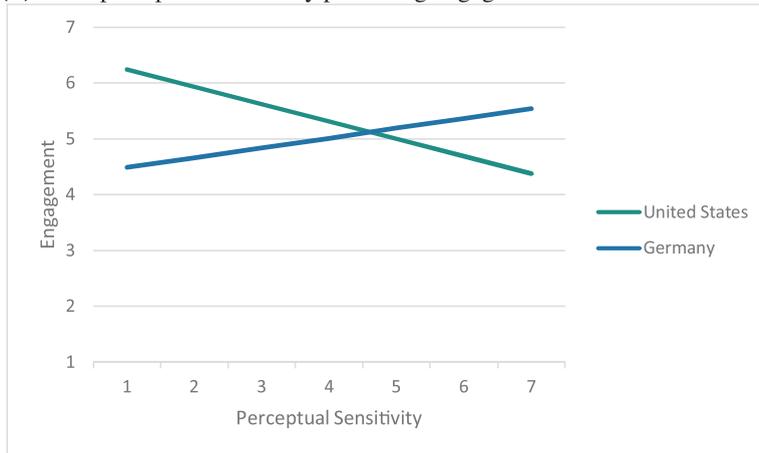
German toddlers were rated higher on perceptual sensitivity and soothability, but lower on attention shifting, relative to their US counterparts. Thus, German toddlers in our sample appeared more acutely aware of mild sensory stimulation in their environment and more susceptible to soothing efforts by their caregivers, yet demonstrated lower levels of attention shifting, compared to US children. Additional research is required to conclusively interpret these differences, which may, in part, be a function of US caregivers emphasizing autonomy and reinforcing independent play behaviors (Dennis, Cole, Zahn-Waxler, & Mizuta, 2002) to a greater degree than their German counterparts. It may be that US children are more reliant on self-soothing efforts, aligning with their parent's motivation to increase offspring autonomy, whereas German children are socialized to be more attuned to soothing attempts by others, potentially driven by cultural values placing a greater emphasis on relatedness. Although Grossman et al. (1985) concluded that lower maternal sensitivity in their German sample compared to the US was reflective of an emphasis on self-reliance, these authors also noted a strong expectation for obedience in the German culture. Given higher overall levels of individualism in the US compared to Germany (Hofstede, Hofstede, & Minkov, 2010), we would expect autonomy-related socialization goals to be stronger for US caregivers. Higher levels of child attention shifting and less sensitivity to subtle aspects of the environment may also be driven by an emphasis of independent activity, wherein US parents may not be as engaged in pointing out less salient stimuli or encouraging sustained attention; all possibilities to be explored in future investigations.

US dyadic exchanges were rated higher in terms of engagement (including sensitivity/responsiveness, synchrony/reciprocity, and emotional tone), as well as stimulation (tempo and intensity). Thus, interactions between children and mothers in the US were more synchronized and enthusiastic, as well as activating compared to German dyads, coupled with greater responsiveness for US

(A) Child discomfort predicting engagement for US and German dyads.



(B) Child perceptual sensitivity predicting engagement for US and German dyads.



(C) Child low-intensity pleasure predicting stimulation for US and German dyads.

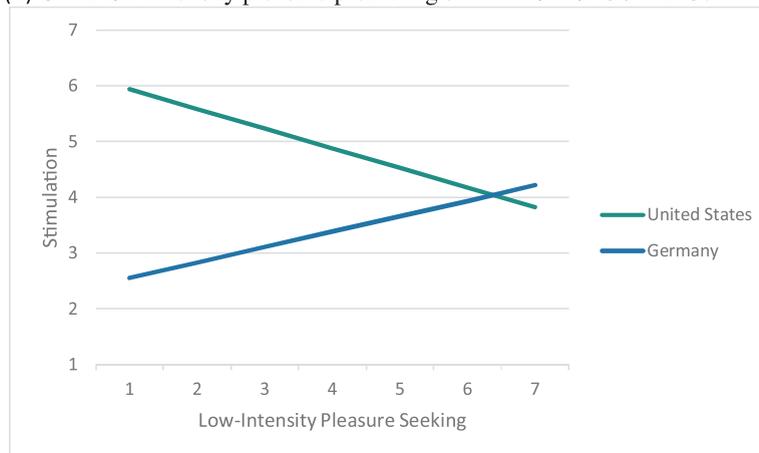


Fig. 3. Cross-cultural comparison of child-effects on parent-child interactions.

(A) Child discomfort predicting engagement for US and German dyads.

(B) Child perceptual sensitivity predicting engagement for US and German dyads.

(C) Child low-intensity pleasure predicting stimulation for US and German dyads.

caregivers. The latter aspect of our results was consistent with Grossman et al. (1985) indicating lower sensitivity for German mothers. Such interactions may model positive emotionality as desirable in interpersonal encounters, consistent with the ideals of the individualistic cultural orientation (Diener & Lucas, 2004) prominent in the US. As noted earlier, play interaction differences are thought to be in part a result of culturally-influenced caregiving, wherein an emphasis on engaging the infant and presenting them with stimulating exchanges likely supports independence rather than interdependence (Triandis, 2001).

Importantly, results of this study indicate that play interactions with caregivers in the US and Germany differ based on several aspects of toddler temperament.

Greater child discomfort and perceptual sensitivity predicted lower ratings of engagement (i.e., sensitivity/responsiveness, synchrony/reciprocity and positive emotional tone) in the US, but not German, dyads. In addition, greater toddler low-intensity pleasure predicted more stimulating exchanges marked by higher intensity and tempo in the German subsample, with non-significant follow-up results for US dyads. Thus, German mothers appeared to expand additional effort to engage more sensitive infants in play, even when this sensitivity precipitated distress. Responsiveness, reciprocity, and positive emotional tone in the context of interactions with caregivers in early childhood have been linked with a variety of positive developmental outcomes (e.g., Ainsworth et al., 1978; Kok et al., 2013; Leclère et al., 2014; Stams, Juffer, & van IJzendoorn, 2002), and our results demonstrate different child correlates to these aspects of parenting across the two cultures considered. The US culture has been characterized as excessively deprecating of negative emotions as part of a “tyranny of the positive attitude” (Held, 2002), a cultural proclivity that may discourage parents from behaving in a manner they perceive as potentially rewarding negative affect or excessive sensitivity in their children.

German mothers engaged in significantly more stimulating play exchanges with toddlers demonstrating greater low-intensity pleasure, which could be viewed as a mismatch, or a lack of “goodness-of-fit”. If US parents place higher value on manifestations of positive emotions, which has been argued in prior studies (e.g., Gartstein, Slobodskaya, Putnam, & Kinsht, 2009), their German counterparts may be less inclined to elicit such expressions from children in play. Coupled with less effort toward engaging the toddler (i.e., lower sensitivity/responsiveness, synchrony/reciprocity, and positive affect of interactions) in the context of German dyadic interactions, this caregiver acceptance of less child enjoyment may be responsible for the observed interaction effect.

Although consideration of children as agentic contributors to their own development, and of cultural values providing a basis for socialization efforts, have been accepted tenets of human development theory for a half century (e.g., Bell, 1968; Bronfenbrenner, 1979), our study is the first to integrate the two to provide empirical examples illustrating cultural moderation of apparent child effects on parent-child interaction. Parents in different cultures vary in their philosophy regarding desirable child traits (e.g., Chen et al., 1998; Underwood, Gartstein, & Kirchhoff, 2018). The meaning of children’s pleasure in calm activities, sensitivity to environmental stimulation and discomfort-related distress may differ from culture-to-culture. Our findings suggest these tend to vary for US and German mothers, and may in turn generate different modes of dyadic interaction.

Importantly, however, cultural specificity with respect to relations between temperament and parent-child interaction was not uniform. In both cultures, high levels of motor activation were linked to low engagement, and high sadness to high stimulation. Whereas cultural specificity invites an interpretation of child effects, as parents may react to children’s traits in ways that are consistent with their societal values, these culture-invariant findings are more open to interpretation with respect to the direction of effect. In both Germany and the US, it may be the case that parents respond to high levels of small-motor movements in their children with diminished sensitivity and positive tone; and that children’s sadness increases parental efforts to stimulate children in both cultures. It is equally plausible, however, that toddlers’ motor activation is influenced by a lack of reciprocity and responsiveness; and their characteristic sadness is altered by parenting that is highly stimulating. Although the direction of effects for these results is ambiguous, their consistency across culture stands as a reminder of the utility of cross-cultural research for identifying relative universals, along with culture-specific, associations.

4.1. Limitations and future outlook

The relatively small sample size was likely the most significant limitation of the present study. For example, although it may have been optimal to correct for multiple statistical tests (e.g., via Bonferroni correction), such an approach would have substantially undermined our ability to detect meaningful effects, particularly with regard to interaction terms. Additionally, our limited sample size necessitates that caution be exercised when interpreting null findings as indicative of true similarities between cultures. Future research should include larger samples and recruit from multiple cultures to ensure the observed differences are not sample specific, and to discern generalizability of the reported effects beyond Germany and the US. This study was also limited in the range of socio-economic status and related factors, which although typical for cross-cultural research (Carter, 1991), should be addressed in future studies, to increase representativeness and because cultural similarities were shown to be greater among more educated people with higher incomes (Katona, Strümpel, Morgan, & Zahn, 1973). Additionally, this study relied on cross-sectional data, which prevents conclusions regarding causality and directionality. That is, although we analyzed and interpreted our data from the perspective of child influences on parent-child interactions, the inverse relations are tenable, particularly with respect to the relations not moderated by culture. Additional sources of temperament information, such as laboratory assessments, should also be included in future research to obtain a more comprehensive picture of cross-cultural variations in individual differences. Despite these limitations, results of this study contribute to the existing literature by demonstrating similarities alongside some cross-cultural differences in temperament and considerable variability in parent-child interactions, critical aspects of early social-emotional development, as well as instances of cultural moderation with respect to child effects associated with toddler temperament.

4.2. Conclusions

Results of our study highlight similarities and notable differences between two cultures that have often been considered largely consistent with respect to their political and economic outlook, similarly Westernized and individualistic in terms of their orientation. Although these cultures appeared more similar than different with regard to many temperament attributes, significant differences in parent-child interaction dynamics were identified, along with variability in child contributions to concurrent parent-child interactions. The latter analyses were largely exploratory, yet results support theories describing transactional processes wherein children are not merely acted upon by their environment, but rather represent active agents in shaping their own development, in what appears to be a different manner across cultures. This pattern of results was largely interpreted from the standpoint of the interdependence/interdependence framework as a cultural value distinction.

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