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Cross-Cultural Differences in Temperament: Comparing Paternal ratings of US and Dutch infants.

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Abstract

This study conducted longitudinal comparisons of US and Dutch paternal ratings of temperament, measured via the Infant Behaviour Questionnaire-Revised, at 4 months (US $n = 99$; Dutch $n = 127$) and 12 months (US $n = 66$; Dutch $n = 112$) of age. US fathers rated their infant higher in the broad temperament trait Surgency, and its subscales vocal reactivity, high-intensity pleasure, and activity level. US fathers also rated their infants higher in Negative Emotionality, and its subscales of sadness, distress to limitations, and fear. Dutch infants received higher ratings in falling reactivity. Though the cultures did not differ in ratings of Orienting/regulatory capacity, US infants were higher on the subscale duration of orienting, and lower in soothability. Significant culture-by-age and culture-by-gender interactions were also noted. Overall, results are largely consistent with those reported for Dutch mothers (Sung et al., 2014) and speak to considerable differences in early temperament development between cultures viewed as largely similar because of their Western/individualistic orientations.

Keywords

Fathers; infant temperament; cross-cultural research

Introduction

The psychobiological model defines temperament as constitutionally-based individual differences in reactivity and regulation (Rothbart & Bates, 2006). These differences in temperament are differentiated into three broad factors, a structure validated across several cultures (Gaias et al., 2012; Gartstein et al., 2006; Montirosso et al., 2013), each composed of fine-grained dimensions (Rothbart, Derryberry, & Posner, 1994). In infancy, negative emotionality (NEG), consisting of sadness, distress to limitations, fear, and (negatively) falling reactivity (ability to lower his/her own level of distress), is first to emerge. Surgency/

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positive emotionality (SUR) is defined by fine-grained scales of smiling/laughter, activity level, approach, vocal reactivity, high-intensity pleasure (enjoyment of intense/complex/stimulating activities), and perceptual sensitivity. Orienting/regulatory capacity (ORC) includes soothability, duration of orienting, cuddliness, and low-intensity pleasure (joy during low-intensity activities). Although a number of factors have been identified that influence temperament development, cross-cultural research makes an important contribution to our understanding of temperament development, because such comparisons in essence represent “natural experiments”, as variability in socialization values/practices, daily routine, and parent-child interactions are not directly manipulated, yet can be expected to result in different outcomes in terms of infant reactivity/regulation. Consistent with this notion, alongside of mounting evidence supporting the biological underpinnings of temperament (e.g., Whittle, Allen, Lubman, & Yücel, 2006), there is considerable support for the importance of contextual and cultural influences on its development (Bornstein, 2013).

A number of studies have focused on differences in temperament between Western and Non-Western nations (see Chen, Yang, & Fu, 2012), and differences in child temperament between the US and multiple European cultures have been reported (e.g., Montirosso et al., 2013; Sung, Beijers, Gartstein, de Weerth, & Putnam, 2014). Gaias et al. (2012) found that US infants were rated higher in NEG and fearfulness compared to Finnish babies, who exhibited higher SUR and effortful control. Most relevant to the present study, Sung et al. (2014) compared differences in maternal reports of temperament for US and Dutch infants at 6 and 12 months of age. Dutch infants were higher compared to US infants in ORC and the subscales associated with this factor, and lower in NEG and its components. Additionally, Dutch infants were higher on smiling/laughter, and US infants on activity level and vocal reactivity (all subscales of SUR; Sung et al., 2014). Significant interactions between culture and age were also reported, wherein Dutch infants demonstrated greater ORC at both 6 and 12 months, with a stronger effect at 6 months of age. US infants were rated higher in fear at both time-points, and a stronger effect was noted at 12 months. Finally, US infants were rated higher on duration of orienting than their Dutch counterparts at 12 months only. Thus, studies examining differences between US infants and those from Northern European cultures, suggest babies from the US are higher in NEG and lower in ORC, with a more nuanced picture emerging for SUR. In addition, a mixed pattern of age related effects emerged, suggesting cross-cultural differences in consolidation of traits. Sung et al. (2014) were hesitant to interpret age related interactions, noting a need for replication. The present study is in the position to offer such a replication, with an independent sample and from the perspective of fathers.

Notable differences between US and Dutch parenting practices and ethnotheories are expected to contribute to different early childhood developmental trajectories for reactivity and regulation. For example, Super and colleagues (2008) noted that US parents described their children’s intense expression of negative, but not positive, affect as problematic, whereas Dutch parents described intense affective expressions as difficult regardless of their tone (i.e., positive or negative affect). Thus, Dutch parents may prefer for their children to be less reactive and better regulated overall, whereas children who emphasize their positive

emotions and attenuate their negative emotions are more likely to demonstrate temperament attributes consistent with US caregiver expectations.

US parents have also been shown to emphasize cognitive abilities in describing their children, whereas Dutch parents demonstrated a tendency to describe their children in terms of sociability (Harkness, Super, & van Tijen, 2000). These attitudes regarding preferences are important because parents also engage in behaviours believed to foster the development of desired traits. Dutch child rearing, for example, has been characterized by "rest, regularity, and cleanliness" (Super et al., 1996), which is thought to translate into enhanced regulatory and social functioning in children (Sung et al., 2014). On the other hand, US caregivers focus on providing their infants with the stimulation thought to enhance cognitive development (LeVine, Caron, & New, 1980). Thus, US children experience a developmental niche wherein there is a greater emphasis on stimulating activities, coupled with expectations for associated affective and behaviour reactivity. In contrast, Dutch children encounter a developmental niche activities encouraging regulation are encouraged, and expectations of social reciprocity and prowess are encouraged.

There have certainly been notable efforts to include fathers in developmental research (Bögels, Stevens, & Majdandžič, 2011; Majdandžič, de Vente, & Bogels, 2016; Majdandžić, Möller, De Vente, Bögels, & Van Den Boom, 2014); however, we could not locate a single cross-cultural study of temperament utilizing father-report. Although fathers and mothers tend to demonstrate relative consistency in ratings of their children's temperament (Gartstein & Rothbart, 2003; Parade & Leerkes, 2008), they also offer unique perspectives (e.g., Bayly & Gartstein, 2013). Furthermore, considerable evidence indicates that fathers have their own influence on the development of individual differences (Cabrera, Shannon, & Tamis-LeMonda, 2007; Moller, Majdandžić, de Vente, & Bogels, 2013; Potapova, Gartstein, & Bridgett, 2014). Lamb (1977), for example, observed that fathers most frequently held their infants to play, and mothers held babies primarily for caregiving purposes. Braungart-Rieker, Garwood, Powers, and Notaro (1998) noted that frustration was displayed differently depending on whether infants participated in a Still Face activity with their mother or father (i.e., more object orientation with mothers and more parent orientation with fathers), suggesting reactivity and regulation are differentially expressed across interactional contexts with caregivers. Fathers', but not mothers, challenging parenting behaviour (encouraging the child in a playful manner to push his/her limits) predicted less observed social anxiety at 4 years of age (Majdandžić et al., 2014). Thus, fathers appeared to play a unique protective function with respect to this domain of internalizing symptomatology. More recently, we have suggested that fathers may participate in parent-child interactions differently in different cultures, depending on the culturally prescribed caregiving roles (Gartstein et al., in press). Together, existing studies suggest that father-report of temperament should be considered in the context of cross-cultural developmental investigations, with the present study addressing this gap in existing research.

The primary goal of this study was to compare longitudinal father-reports of infant temperament in the US and the Netherlands, utilizing a widely-used measure of infant temperament at 4 and 12 months of age. We formulated hypotheses based on maternal ratings from these two cultures reported by Sung et al. (2014). Consistent with these results,

we anticipated US infants to have higher ratings on NEG and its subscales fear, frustration, and sadness, and lower on falling reactivity, as well as lower on ORC and the subscales of cuddliness, low-intensity pleasure, and soothability. We hypothesized that US fathers would rate their infants higher on activity level and vocal reactivity, and lower on smiling/laughter. For culture-by-age interactions, we predicted more pronounced differences in ORC at 4 months, along with greater differences in fear at 12 months, and differences in duration of orienting notable primarily at 12 months. Analyses addressing culture-by-sex interactions were exploratory, as these effects were not identified by Sung et al. (2014).

Methods

Participants

Both the Dutch and US sample were collected independently from the sample utilized by Sung et al. (2014). For the current US sample, fathers (70.1% Caucasian) were recruited as the partners of a subset of 148 English-speaking mothers with healthy full-term infants, asked to take part in a longitudinal evaluation of infant temperament carried out between 2003 and 2007. All families were recruited through birth announcements and a universal prevention program (First Steps) made available to all women giving birth at the two local medical centres (Pullman Regional Hospital, Pullman, WA and Gritman Medical Centre, Moscow, Idaho), wherein staff shared study information with participants. Participating fathers provided ratings of infant temperament at 4 (n = 98; 52.7% male) and 12 (n = 66; 47% male) months of age[1]. Participants were reimbursed for taking part in the study ($20 per assessment) to encourage continued involvement, and were contacted by telephone with reminders, as needed. The majority of fathers completed at least 16 years of education (M = 16.11, SD =2.54, range 12 – 22 years). Comparative analyses between subjects with complete records (i.e., those with ratings at both 4 and 12 months) and those who did not provide ratings at 12 months showed no significant differences between the groups. Specifically, attrition was not systematically related to child age, sex, or temperament ratings at 4 months. Nor were there significant differences between “responders” and “non-responders” on paternal age and education.

The Dutch sample participated in a larger study between 2007 and 2010, aimed at improving our understanding of how social anxiety develop, links to parent-child relationships, and the role of fathers in particular (Majdandžič et al., 2016). Families were recruited during pregnancy through leaflets provided by midwives in Amsterdam and in surrounding cities, at pregnancy courses, at baby shops, and through advertisements in print media. After completing the assessment, families received a 20-euro gift voucher and DVD recordings of the lab visits, and the child received a small present. The study team attempted to encourage ongoing participation of the families by regular personal contact (phone), sending reminders about completing questionnaires, regularly sending newsletters about the study and birthday cards for the children, and by a personal approach during the lab and home visits.

[1]US data was provided by two samples: 1) Fathers from Eastern Washington and Northwestern Idaho (n=75; 53.4% male, 91.6% Caucasian), as well as 2) those from Washington, Idaho, Montana, Oregon, and Nevada (n = 23, 44.0% male, 100% Caucasian)

Fathers of 126 children (44.0% male) participated at 4 months, at 12 months 111 fathers continued to participate. Fathers were relatively highly educated, $M = 6.60$, $SD = 1.59$, range 1–8 (1 – primary education, to 8- university) like their US counterparts. These fathers did not differ significantly from their US counterparts in either ethnicity, paternal age, or child sex.

Socioeconomic data were collected for the US and the Dutch samples using different measures, which nonetheless enabled us to make a qualitative comparison with respect to the nature of paternal occupations. That is, the scale of professional level used in the Netherlands ranged from 1, designating positions that involve manual labour, for which no education is required, to 11 (labour for which a university degree is required), whereas in the US rankings of occupational prestige were obtained (range: 15.00 – 86.19; Stevens & Featherman, 1981). These parallel indicators allow us to conclude that in both samples the majority of fathers were employed in positions that required completion of High School, or its equivalent, and often a college education.

Because of differing education systems, measures of education were transformed (c.f. Sung et al., 2014): 1= did not finish high school (US) or VMBO/MAVO/HAVO degrees (NL); 2= completed high school, but no participation in a professional or graduate program; VMBO/MAVO/HAVO degrees; 3= completed associates degree or < 4 years of college (US), or middle or higher professional education including VWO (NL), and 4= completed university degree. US fathers appeared to be significantly more educated than their Dutch counterparts according to this scale, and education was thus included as a covariate in subsequent analyses.

Although tests of socio-demographic equivalency are necessarily limited by the availability of comparable indicators, each sample represents an identifiable group that shares important lifestyle factors and cultural influences. These families share cultural identification, with respect to a specific Dutch or US community, noted as important in prior cross-cultural research (e.g., Super et al., 1996). Thus, these samples provide information reflective of temperament-related tendencies and variations in their specific communities.

Measures

The Infant Behaviour Questionnaire-Revised (IBQ-R; Gartstein & Rothbart, 2003), a parent-report instrument that measures infant temperament along 14 subscales, in turn comprising three overarching factors— SUR: approach, vocal reactivity, high-intensity pleasure, smiling/laughter, and perceptual sensitivity, NEG: sadness, fear, distress to limitations, and negatively loading falling reactivity, and ORC: duration of orienting, cuddliness, low-intensity pleasure, and soothability. Factor scores were created by averaging corresponding scales. The IBQ-R has been shown to possess generally good psychometric properties (Gartstein, Bridgett, & Low, 2012; Gartstein, Knyazev, & Slobodskaya, 2005; Parade & Leerkes, 2008). Internal consistency reliability estimates via Cronbach's alpha for the US sample ranged from .67 to .89 at 4 months, and .76 to .93 at 12 months; For the Dutch sample, from .70 to .92 at 4 months, and .69 to .89 at 12 months.

Results

Prior to performing comparative analyses, patterns of missingness were examined, revealing that data were not missing at random (Little's MCAR test <.05). Given notable attrition within the US sample, a strict data cleaning procedure was utilized wherein individuals who did not provide any temperament data at either time 1 or time 2 (e.g., for whom only covariate scores were available) were not included in analyses. Following this cleaning procedure, a follow-up inspection of missing data was performed, guided by Widaman (2006). Within this consolidated dataset, item nonresponse ranged from 0.0% to 1.1% of values. These conditions supported using single imputation to produce a complete data set, using the same algorithms (EM) as multiple imputation techniques, as single imputation is appropriate when missing data are at a low level (i.e., 1–2%) (Widaman, 2006). This approach preserved every individual in the dataset who had provided some responses on the outcome variables, maximizing statistical power. The imputed dataset can be expected to retain reasonable levels of lack of model-data fit that were present among the non-missing values (Widaman, 2006). We balanced the simplicity of a single imputation with the EM algorithms and any inflation of Type I error that can occur by reporting significance at the .01 and .05 level, as recommended (Cox, McIntosh, Reason, & Terenzini, 2014). We also report effect sizes to help judge the practical significance of the statistically significant results (i.e., $d = .20$ is considered "small," $d = .50$ is considered "medium," and $d = .80$ is considered "large").

After performing the missingness procedure, our analytic strategy paralleled Sung et al. (2014), computing correlations between temperament scales, paternal age and education. Paternal education emerged as a covariate: r ranges: −.19 to .29; mean of absolute values of individual $r = .12$. Next, 2 (culture) X 2 (sex) X 2 (age) mixed design ANCOVAs (2 between: culture and sex; 1 within: age) were conducted with paternal education as a covariate. Follow-up tests for significant interaction effects were performed. Finally, stability of temperament from 4 to 12 months was assessed using Fisher's Z tests. Descriptive statistics were computed first (Table 1).

Effects of culture, age, and sex

Differences between the two cultures emerged for two of the three factors, and 9 of 14 subscales (Table 2). US infants were rated higher on SUR, including vocal reactivity, high-intensity pleasure, and activity level (Figure 1). They were also rated higher in NEG, along with sadness, distress to limitations, and fear, and lower on falling reactivity. No differences on the ORC factor were observed, but US fathers rated their infants higher on duration of orienting, and lower on soothability, compared to Dutch fathers[2]. Age and sex main effects were not presented/discussed, as these were not relevant to the goals of this study.

Culture-by-age interactions were significant for NEG, distress to limitations, fear, and sadness, as well as SUR, approach, and vocal reactivity (Table 2). Although the culture-by-age interaction for ORC was not significant, these interactions for cuddliness and duration of orienting reached statistical significance. Follow-up one-way ANOVAs, conducted

[2]Age and sex main effects were not presented/discussed, as these were not relevant to the goals of this study.

separately at 4 and 12 months, demonstrated that US infants were higher on NEG, distress to limitations, and sadness, at both ages, but rated higher on fear only at 12 months. Dutch infants were rated higher on cuddliness, relative to US children, only at 12 months. US infants received higher duration of orientating scores, compared to their Dutch counterparts, only at 12 months as well. US babies were rated higher in vocal reactivity at both ages, yet were received higher SUR and approach scores, compared to the Dutch, only at 12 months. Overall, a medium effect size was demonstrated for NEG at 4 months (d = .54), whereas a large effect size was noted at 12 months (d = 1.20). Similarly, cultural differences for distress to limitations (4 months: d=.69; 12 months: d=1.18), sadness (4 months: d=.45; 12 months: d=.92), and vocal reactivity (4 months: d=.33; 12 months: d=.97) were more pronounced at 12 months.

Culture-by-sex interactions were significant for cuddliness and low-intensity pleasure (Table 2). Follow-up t-tests revealed that Dutch boys were perceived by their fathers as significantly more cuddly than US boys (t (89) = 3.61, p<.01, d = .81), yet ratings of girls did not differ (t (77) = .26, p>.05, d = .06). For low-intensity pleasure, Dutch boys were rated higher than US boys (t (89) = 3.01, p<.05, d = .67), with no differences between girls (t (77) = 1.35, p>.05, d = .32).

Effects of culture on stability of temperament

Temperament ratings demonstrated moderate stability between 4 and 12 months in both cultures (Table 3; US mean r= .38, Dutch mean r= .46). Father ratings of sadness for Dutch infants were significantly more stable than for US infants (Table 3).

Discussion

The current study is the first to our knowledge to examine cross-cultural differences in paternal ratings of temperament, with the pattern of results largely consistent with mother-report (Sung et al, 2014). The present study and Sung et al. (2014) found that US infants are rated higher on NEG, sadness, distress to limitations, fear, and low falling reactivity compared to Dutch infants. These main effects were informed by a number of culture-by-age interactions, as differences in NEG, distress to limitations, and sadness were of greater magnitude at 12 compared to 4 months, and US infants were only rated as more fearful than Dutch infants at 12 months of age. Sung et al. (2014) noted a similar pattern of fear-related results, wherein US infants were rated by their mothers as more fearful than Dutch children, with these differences being more pronounced when the infants were 12, compared to 4 months of age. This difference in the developmental progression for NEG, with common elements observed across reports of both caregivers, may be attributable to particularly salient contextual elements, which differ for US and Dutch infants. That is, differences in daily routine/interactions, parental socialization goals and/or ethnotheories that inform parenting practices of both mothers and fathers likely contributed to the consistent patterns of cross-cultural differences in NEG observed across independent samples of primary and secondary caregivers. For example, as Dutch parents were noted to prioritize emotional closeness and interdependence, and to behave in a relatively more patient/responsive manner to infant bids for attention (Harkness et al., 2000), many expressions of NEG could be

addressed pre-emptively (i.e., prior to reaching peak levels) in the Netherlands, which may shape infant NEG over time such that the cultural differences become apparent, or more pronounced This level of anticipatory responsiveness is less likely in the US, where independence and object play are emphasized (Bornstein, Haynes, Pascual, Painter, & Galperín, 1999). With infants appearing more similar at birth, and differences becoming more prominent across time, it may be that cultural and contextual contributors to individual differences have a cumulative effect.

Differences in SUR, activity level and vocal reactivity were consistent with Sung et al. (2014). That is, US infants were rated significantly higher than their Dutch peers in all three domains, suggesting that US infants demonstrate significantly more positive affect than their Dutch peers, particularly through movement and vocal expression. However, results for high-intensity pleasure and smiling/laughter were somewhat discrepant, insofar as significant differences for the latter were observed based on mother (by Sung et al., 2014), but not father-report, based on findings of the current investigation. These differences could be a function of paternal perceptions differing from mothers', and require further study, including additional sources of information, such as temperament observations and/or psychophysiological data. As with NEG and the associated subscales, differences in SUR, vocal reactivity, approach, and activity level were more pronounced at 12, compared to 4 months-of-age. Results obtained for SUR and NEG suggest that US infants are more reactive than Dutch infants in terms of overall emotional expression, and could be explained in part by the Dutch caregivers maintaining a regular schedule, and US caregivers presenting infants with changing and stimulating environments (Harkness et al., 2000), possibly leading to relatively higher arousal in US babies. The present findings also suggest that a number of differences between US and Dutch infants become more pronounced in later development. It is possible that these differences are more amenable to socialization mechanisms, and that increased postpartum exposure to these factors results in pronounced expression of the associated traits.

Cross-cultural differences in regulation were also noted, some of which were not consistent with the findings of Sung et al. (2014). Dutch infants were described as more soothable in both studies. However, unlike Sung et al. (2014), paternal ratings of ORC did not differ between cultures, yet US fathers rated their infant as demonstrating greater duration of orienting. Parallel findings for mothers and fathers concerning soothability likely speak to considerable cultural influence on the development of this domain of regulation. Consistent differences across maternal and paternal report could be a function of more robust cultural values related to infant regulatory capacity. According to Harkness et al. (2000), Dutch parents hold favourable views of infant's dependence on caregivers for soothing and regulation of affective states. These favourable views may in turn translate into behaviours that reinforce infants for quickly responding to the soothing efforts of their parents, encouraging the development of emerging self-regulation (Bernier, Carlson, & Whipple, 2010; Towe-Goodman et al., 2014). Further research with additional sources of information is needed to further elucidate the nature of this influence, for example, considering psychophysiological markers of regulation (e.g., recovery from a mild stressor assessed via cortisol reactivity).

Cultural differences in cuddliness and low-intensity pleasure were moderated by sex. Dutch fathers rated boys (but not girls) higher on cuddliness than US fathers; however, this sex difference did not emerge on the basis of mother-report (Sung et al., 2014). Dutch fathers also rated boys higher on low-intensity pleasure relative to US fathers, which could be a result of fathers' differential experiences with their sons and daughters across the two cultures. That is, Dutch fathers may spend more time in calm playful activities with their sons, having more opportunity to elicit/observe low intensity pleasure reactions and to hold their male infants, encouraging close physical contact, promoting the noted differences in cuddliness. It is also possible that US fathers espouse gender biases which discourage engaging in activities which might promote cuddliness, as research has found that US fathers are more attentive to their boys disharmonious behaviours that harmonious behaviours, whereas the opposite is true for girls (Chaplin, Cole, & Zahn-Waxler, 2005). These possibilities should be examined in future research, addressing father-infant interactions in the US and the Netherlands.

With regard to temperament stability, unlike Sung et al. (2014), we found that only stability coefficients for sadness differed between cultures, with ratings of Dutch fathers more consistent across infancy than those of US fathers. This pattern of results may reflect a difference between maternal and paternal experiences with infant temperament development. However, replication is required prior to drawing firm conclusions, as such a difference also may reflect actual (as opposed to perceived) developmental changes in the expression of sadness over the first year of life (see Gartstein et al., 2010 for an example of developmental changes in fear expression).

Although these findings contribute to the existing literature by addressing cross-cultural differences in paternal perceptions of infant temperament, results must be considered in the context of several limitations. For example, though power was sufficient for detecting medium to large effects, power was limited for detecting small effects (particularly regarding interactions), potentially reflecting more subtle cross-cultural differences. Furthermore, there were many consistencies between our findings and those of Sung et al. (2014), yet the few discrepancies observed between the present study and Sung's prior results may be due to intracultural differences reflecting different samples, rather than differences between mothers and fathers. The current study consisted of relatively homogeneous, generally mid-SES, well-educated samples. Future studies should conduct comparisons between US and Dutch infants, as well as children from other cultures, obtaining multiple samples (i.e., from a series of communities/geographic locations). On a similar note, future research should obtain more diverse samples with respect to demographic variables, ensuring greater generalizability. Despite these limitations, the findings of this study, particularly in their relation to the findings of Sung et al. (2014) may be useful for guiding questions that are considered in future cross-cultural studies.

Overall, our results were largely consistent with Sung et al. (2014), yet indicative of nuances in parents' ratings. Results that parallel those of Sung et al. (2014) likely reflect more robust cultural influences on temperament, whereas discrepancies may provide useful information for exploring informant effects (i.e., maternal vs. paternal ratings). At the same time, discrepancies may indicate that fathers' versus mothers' experiences with their infants'

temperament displays are different in the US and the Netherlands in a manner that leads to variable patterns of cross-cultural differences in mother and father-report of infant attributes. Dutch fathers, for example, may spend more time interacting with their infants, relative to US fathers, resulting in differential access to temperament related information. The latter could lead to a pattern of cross-cultural differences not consistent with maternal report. Our results based on father-report of infant temperament, together with Sung et al. (2014) maternal report findings, extend existing cross-cultural research. Specifically, this study provides additional information concerning early social-emotional development in the US and the Netherlands, indicating that Dutch infants may present with a less reactive profile.

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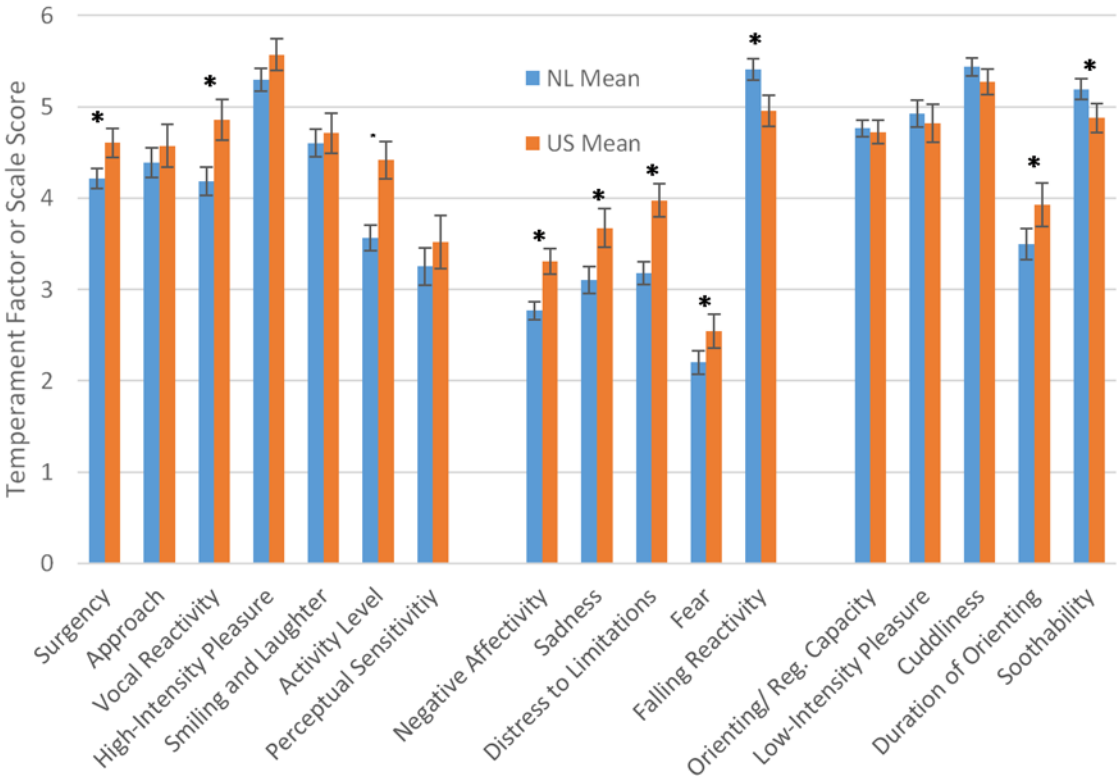

Figure 1:

Cross-cultural comparison of factor and subscale means. Note:Significant differences (p<. 05) are indicated by *.

TABLE 1.

Means and SDs of IBQ-R factor and subscale scores for 4- and 12-month-old infants in the Netherlands and USA

	The USA		Netherlands	
	4 Months	*12 Months*	*4 Months*	*12 Months*
Scale	***M (SD)***	***M (SD)***	***M (SD)***	***M (SD)***
Surgency	**4.11 (.78)**	**5.05 (.50)**	**3.89 (.70)**	**4.55 (.50)**
Approach	3.87 (1.38)	5.42 (.64)	3.75 (1.14)	4.97 (.69)
Vocal Reactivity	4.32 (1.06)	5.24 (.64)	3.95 (.93)	4.46 (.94)
High-Intensity Pleasure	5.17 (.94)	5.88 (.59)	4.92 (.87)	5.66 (.58)
Smiling and Laughter	4.52 (1.09)	4.84 (.72)	4.57 (1.00)	4.67 (.79)
Activity Level	3.81 (.85)	4.48 (.86)	3.25 (.81)	3.93 (.84)
Perceptual Sensitivity	2.96 (1.27)	4.07 (1.12)	2.88 (1.21)	3.62 (1.11)
Negative Affectivity	**3.09 (.60)**	**3.58 (.61)**	**2.70 (.57)**	**2.83 (.56)**
Sadness	3.58 (.99)	3.85 (.87)	3.11 (.81)	3.08 (.80)
Distress to Limitations	3.60 (.79)	4.43 (.81)	3.00 (.69)	3.34 (.83)
Fear	2.16 (.83)	2.96 (1.07)	1.96 (.63)	2.43 (.76)
Falling Reactivity	4.99 (.83)	4.97 (.77)	5.27 (.76)	5.51 (.69)
Orienting/Regulator Capacity	**4.75 (.59)**	**4.60 (.51)**	**4.83 (.57)**	**4.72 (.49)**
Low-Intensity Pleasure	4.84 (.97)	4.74 (.87)	4.91 (.92)	4.97 (.78)
Cuddliness	5.72 (.64)	4.81 (.69)	5.71 (.52)	5.18 (.60)
Duration of Orienting	3.76 (1.06)	3.92 (1.11)	3.67 (.94)	3.37 (.95)
Soothability	4.70 (.73)	4.93 (.61)	5.02 (.77)	5.37 (.73)

Notes: Results for factor scores presented in bold. Ns vary between analyses as a result of variable missing data. The Netherlands: *n*s = 127 (4 months) and 112 (12 months). The USA: *n*s = 99 (4 months) and 58 (12 months).

TABLE 2.

Effects of culture, age, and sex on IBQ-R factors and subscales

Scale	*Culture (F)*	*Culture × age (F)*	*Culture × sex (F)*
Surgency (SUR)	**14.30****	**5.46***	**0.17**
Approach	1.43	5.17*	0.47
Vocal Reactivity	21.61**	6.38*	0.58
High-Intensity Pleasure	5.74*	0.34	0.29
Smiling and Laughter	0.54	3.41	0.00
Activity Level	42.31**	0.29	0.04
Perceptual Sensitivity	2.00	2.00	0.00
Negative Affectivity (NEG)	**35.00****	**10.76****	**0.07**
Sadness	17.37**	6.96**	0.00
Distress to Limitations	43.99**	8.47**	0.53
Fear	8.29**	5.06*	3.40
Falling Reactivity	16.91**	1.52	0.11
Orienting/Regulatory Capacity (ORC)	**0.21**	**0.01**	**3.41**
Low-Intensity Please	0.61	0.01	9.67**
Cuddliness	3.10	6.12*	7.11**
Duration of Orienting	7.59**	6.09*	0.01
Soothability	8.95**	1.01	0.06

Notes: Results for factor scores presented in bold. Repeated measures ANOVAs, with paternal education as a covariate. df =165.

** p <.01,

* p <.05

TABLE 3.

Stability of temperament from 4 to 12 months of age in the USA and the Netherlands

	Stability (correlations) from 4 to 12 months of age		
Scale	**The USA**	**The Netherlands**	**Difference in Stability (Fisher's Z)**
Surgency	.48**	.66**	−1.58
Approach	.26	.44**	−1.22
Vocal Reactivity	.49**	.51**	−0.11
High-Intensity Pleasure	.31*	.44**	−.92
Smiling and Laughter	.60**	.43**	1.43
Activity Level	.47**	.33**	.95
Perceptual Sensitivity	.38**	.55**	−1.35
Negative Affectivity	.32*	.52**	−1.54
Sadness	.28*	.55**	−2.02*
Distress to Limitations	.30*	.44**	−.96
Fear	.44**	.40**	.32
Falling Reactivity	.11	.30**	−1.21
Orienting/Regulator Capacity	.47**	.50**	−.22
Low-Intensity Pleasure	.44**	.42**	.13
Cuddliness	.48**	.48**	.04
Duration of Orienting	.43**	.44**	−.24
Soothability	.18	.34**	−1.03

Notes: Results for factor scores presented in bold. n = 112 in the Netherlands sample, n = 58 in USA sample.

* $p < .05$,

** $p < .01$