

The Bio-Culture of Parenting: Evidence From Five Cultural Communities

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SYNOPSIS

Objective. This study analyzes culturally formed parenting styles during infancy, as related to the sociocultural orientations of independence and interdependence. **Design.** Free-play situations between mothers and 3-month-old infants were videotaped in 5 cultural communities that differ according to their sociocultural orientations: cultural communities in West Africa ($N = 26$), Gujarat in India ($N = 39$), Costa Rica ($N = 21$), Greece ($N = 51$), and Germany ($N = 56$). The videotapes were analyzed using coding systems that operationalize the component model of parenting with a focus on 4 parenting systems, including body contact, body stimulation, object stimulation, and face-to-face contact. **Results.** 2 styles of parenting (distal and proximal) can be related to the sociocultural orientations of independence and interdependence. It is apparent that they express parenting priorities in particular ecocultural environments. **Conclusions.** Infants participate, from birth on, in sociocultural activities that are committed to cultural goals and values which inform parenting behaviors.

INTRODUCTION

Parenting is a significant feature of culture (Harkness & Super, 1995). It represents a major mechanism for the transmission of cultural values and practices between generations. At the same time, parenting constitutes an investment that shapes individuals' future life histories also with respect to their reproductive strategies, and thus, their own parenting style (Geary & Flinn, 2001; Keller, 2001). Thus, variations of parenting across cultures and developmental contexts are to be expected (Keller & Greenfield, 2000). It is therefore not surprising that tremendous cultural/contextual differences among the parenting behaviors and styles of caregivers with small

infants have been reported in previous research (e.g., Bornstein, 1994; Bornstein, Tal, & Tamis-LeMonda, 1991; Hewlett, Lamb, Leyendecker, & Schoelmerich, 2000; Hoff, Laursen, & Tardif, 2002; Konner, 1991; LeVine, 1990, 1994; Super & Harkness, 1996; Weisner, 2000; for summaries, see Greenfield & Suzuki, 1998; Keller & Eckensberger, 1998; Shweder et al., 1998).

In line with the anthropological studies of the culture and personality school (Keller, 2000; Mead, 1973; Whiting & Whiting, 1975; see also Poor-tunga & van Hemert, 2002), LeVine (1974) proposed that the different parenting strategies across cultures are related to different developmental goals. He defined this in a hierarchy, with health and development as the basic and primary goal, economic independence as the second goal, and the cultural foundation of personality as the third goal. During the last decades, it has been proposed that these developmental goals be integrated with the sociocultural orientations of independence and interdependence (Fiske, Kitayama, Markus, & Nisbett, 1998; Keller, 2002), which are supposed to be adjustments for particular environmental conditions (Bornstein, Haynes, Pascual, Painter, & Galperin, 1999; Greenfield, 1994; Kağitçibaşı, 1996, 1997; Keller, 2003; Keller & Eckensberger, 1998; Keller & Greenfield, 2000; Markus & Kitayama, 1991; Triandis et al., 1986; Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). The sociocultural orientation of independence prioritizes the self as an individual agent, whereas the interdependence model prioritizes the self as a co- or communal agent (Greenfield, Keller, Fuligni, & Maynard, 2003; Kağitçibaşı, 2004; Wang, Leichtman, & Davies, 2000). The independent agent is supposed to be adjusted to modern and postmodern information-based societies in which individual performance and competition among individuals are necessary requirements for a successful life. The communal agent is supposed to be adjusted to agrarian subsistence-based communities in which cooperation among individuals pertaining primarily to social roles is crucial for survival. Independence and interdependence, thus, represent systems of cultural priorities defining desirable endpoints (Bruner, 1986) or optimal ways of being (Csikszentmihalyi & Rathunde, 1998) for specific environments.

In line with others, we assume that these sociocultural orientations are acquired during socialization processes (for a summary, see Greenfield et al., 2003). There is ample evidence in the literature that different cultural environments emphasize independence and interdependence differently in terms of socialization goals (Chao, 1995; Leyendecker, Harwood, Lamb, & Schoelmerich, 2002), parental beliefs and ethnotheories (Harkness, Super, & Keefer, 1992; Keller et al., 2003; Keller, Yovsi, & Voelker, 2002), parenting contexts (e.g., co-sleeping; Shweder, Jensen, & Goldstein, 1995),

as well as parenting behaviors (Bornstein et al., 1991; Leichtman, Wang, & Pillemer, 2003; LeVine, in press).

We refer to cultural environments as ecosocial contexts with a shared understanding of desirable endpoints of development that are contingent on contextual demands. It has been demonstrated that countries or nations host multiple cultural communities with different parental ideas and practices. The socioeconomic situation especially has been identified as informing parenting ideas and practices (e.g., De Jong Gierveld & Dykstra, 2002; Kusserow, 1999; Palacios & Moreno, 1996). Also rural and urban lifestyles have been identified as instantiating different orientations to family relationships (Kağitçibaşı, 1996). Although individuals can participate in different cultural communities at the same time as, for example, migrants do, parenting ideas and practices constitute cultural values and practices with high personal relevance and relative resistance to change (Birg, 1996; Keller & Greenfield, 2000). Nevertheless sociocultural orientations are appropriated individually by adopting, transforming, and creating cultural processes that constitute intraindividual variability (Tomasello, 2001). Here we introduce the component model of parenting that is assumed to build the foil from which cultures select behavioral propensities that form adaptive parenting styles.

The Component Model of Parenting

Parenting can be conceived of as having evolved as part of individuals' reproductive strategies and can thus be considered as crucial in shaping individuals' life histories (Bjorklund, 2000; Bjorklund & Pellegrini, 2000; Keller, 2002). Accordingly, parental investment has been related to children's developmental trajectories (Belsky, Steinberg, & Draper, 1991; Bjorklund, 2000; Chisholm, 1996; Keller, 1996). Evolutionary theorists have argued that it is highly unlikely that only one adaptive pattern of parent-child relationships evolved in the environment of evolutionary adaptedness (Belsky, 1999; Bjorklund & Pellegrini, 2000). The component model of parenting postulates a phylogenetically evolved repertoire of parenting systems: primary care, body contact, body stimulation, object stimulation, and face-to-face exchange (for other componential systems, see Bornstein, 2002; Bradley & Caldwell, 1995). These parenting systems of functionally related behaviors are considered as basically independent of each other (Keller, 2002) to allow alternative strategies through different combinations. The composition of the particular mixture—the parenting style consisting of different amounts of the behaviors described in the following discussion—is supposed to emerge as part of the parent's own developmental history (Keller, 2002).

With the component model of parenting we specifically address the first half-year of an infant's life. Neurophysiological research has indicated that the newborn period can be characterized as a brain imprint period. The exposure to particular parenting experiences and their reinstatement by repetition necessary due to the restricted memory span of an infant (Rovee-Collier & Shye, 1992) reinforce synaptic connections, which then become wired in the neonatal brain (for summaries, see Schore, 2000; Siegel, 1999). It can be assumed that prevalent social experiences are represented in perceptual and motor schemas that form the early memory structure of the self. Due to the lifelong plasticity of the human brain, these processes cannot be conceived of as irreversible. Yet they form the first unit in a developmental chain in ecocultural contexts that have stability at least for some developmental periods (Keller, 1991).

Our research agenda particularly addresses parenting of 3-month-old babies. The socio-biobehavioral shifts observed around that time in many parts of the world (Chisholm, 1996; Cole & Cole, 2001; Keller & Eckensberger, 1998; Saraswathi & Pai, 1997) ensure that infants become more "readable" and comprehensible to caregivers who can, thus, fully develop their caregiving ideas and practices. This age span therefore has been regarded as focal for the prediction of children's consequent behavioral development (Keller, 1991, 1992). For the study of cultural profiles of parenting, the 3-months age period allows concentration on the mother-child relationship because the mother is the most significant caregiver in all cultural environments at that time (DeLoache & Gottlieb, 2000). The following sections describe the four parenting systems that are relevant for this study.

The body contact system. This parenting system conceptualizes bodily closeness. In many ecocultural contexts, infants are carried by their mothers or other caregivers for a substantial part of the day ("back and hip cultures," LeVine, 1990; see also Barr, Konner, Bakeman, & Adamson, 1991, for the !Kung; Hewlett, 1991, for Aka Pygmies; Hill & Hurtado, 1996, for South American Ache). The psychological function of body contact consists mainly of the experience of emotional warmth, which is associated with social cohesion (MacDonald, 1992) and feelings of relatedness and belongingness (e.g., Mize & Pettit, 1997). Warmth contributes to the child's willingness to embrace parental messages and values (Chen et al., 2003; Kochanska & Thompson, 1997; Maccoby, 1984), preparing the individual for a life that is based on harmony and respects the hierarchy among family members or the primary social group (Keller, Lohaus, Voelker, Capenberg, & Chasiotis, 1999).

The body stimulation system. This system of parenting provides the infant with motor stimulation through touch and movement. These experiences range from lifting the baby up and down in an upright position by West African caregivers to German caregivers' gently exercising the arms or legs (Keller, 2003; Keller, Voelker, & Yovsi, in press; Keller, Yovsi, & Voelker, 2002). Body stimulation can be related functionally to motor development. The motor precocity of the African infant (Geber & Dean, 1959; Super, 1976) has been interpreted as a consequence of these early stimulation patterns (Bril, 1989). Also, on the Indian subcontinent, baby bathing and massaging have been assumed to help accelerate developmental progress (Landers, 1989; Walsh Escarce, 1989). The general psychological function of body stimulation can consist of intensifying body perception and, thus, the discovery of one's own body effectiveness in relation to resources of the environment. The body is experienced as an "agent" situated in the environment (Rochat, 1997, p. 99) and, thus, the emergence of a body-self is promoted.

The object stimulation system. The object stimulation system is aimed at linking the infant to the nonpersonal world of objects and the physical environment in general. Early object stimulation is pervasive in Western industrialized societies where objects can replace the caregiving person (Keller & Greenfield, 2000). Object stimulation is expected to foster cognitive growth (Keller, 2004; Keller et al., 2003; Yovsi, 2001). It focuses on shared extradyadic attentional processes and thus initiates and supports the development of metacognitions. The psychological function of early object stimulation consists of nurturing the cognitive system and disengaging the infant from dependency social relationships at the same time.

The face-to-face system. This parenting system consists of face-to-face exchange, which is especially characterized through mutual eye contact and the frequent use of language (Keller, 2002). Through prompt answers to communicative signals, the infant comes to perceive himself or herself as the cause of the parental action. Thus, the infant is informed about his or her uniqueness and self-efficacy (Keller, 1996). Also positive emotionality, like smiling and baby talk, can be communicated in face-to-face interactions (Keller et al., 1999, 2003; Lohaus, Keller, Ball, Elben, & Voelker, 2001). The prevalence of the face-to-face parenting system is especially salient in contexts in which a separated agency has to meet the demands of self-contained and competitive social relationships.

Hypotheses

Infants experience parenting styles that are composed of different systems, thus differently supporting independent and interdependent socio-

cultural orientations. Every infant supposedly experiences some aspects of each parenting system. Yet the dominance of some systems over others can differ systematically across cultural communities with different socio-cultural orientations. Based on the evidence presented, we relate the face-to-face system and the object stimulation system to independent socio-cultural orientations and the body contact system and the body stimulation system to interdependent sociocultural orientations.

For the empirical realization of our study, we adopted a cross-cultural research strategy. We assessed samples from five communities that differ with respect to their ecocultural features and, thus, also with respect to their assumed sociocultural orientations to independence and interdependence. We infer the sociocultural orientation from existing literature on sociocultural orientations and socialization goals in these respective cultural communities as well as our own assessments of family orientation (allocentrism) and socialization goals in comparable samples from these cultural communities (Keller, Yovsi, Borke, Jensen, & Papaligoura, 2004). In this study, we assessed samples from Germany, Greece, Costa Rica, Cameroon, and India. The Cameroonian Nso and the Indian Gujarati Rajputs are both traditional farming communities that have been described to have an interdependent sociocultural orientation (Keller, Voelker, Abels, & Yovsi, 2004; Nsamenang & Lamb, 1994; Yovsi & Keller, 2003). German middle-class families can be regarded as representing an independent orientation to family life and conceptions of achievement (Keller et al., 2002; Keller, Zach, & Abels, *in press*), which are rooted in a societal climate oriented toward individualization (Beck & Beck-Gernsheim, 1994; Friedrichs, 1998), stressing early independence and self-regulation (Keller & Lamm, 2004; Keller, Miranda, & Gauda, 1984; Keller et al., 2002; Zach & Keller, 1999). Greece has been viewed as a society that rapidly changed from collectivistic to individualistic values during the 1970s and 1980s (Georgas, 1989; Georgas, Berry, van de Vijver, Kağitçibaşı, & Poortinga, *in press*), which is expressed in the preference of parenting systems that can be assumed to support independent socialization goals (Keller et al., 2003). Costa Ricans express different degrees of interdependence as well as independence in their parenting styles. They favor interdependent family relationships, stressing closeness, respect, and harmony. On the other hand, the prevalence of U.S.-American TV in all parts of the country implies constant exposure to individualistic lifestyles (Rosabal-Coto, 2004; see also for other South American and Latin American societies, Cote & Bornstein, 2000; Miller & Harwood, 2001).

Based on the assumption of a flexible organization of independent components of parenting, we expected a more proximal parenting style focus-

ing on body contact and body stimulation to be characteristic for the Nso and Gujarati rural families. We expected a more distal parenting style focusing on face-to-face contexts and object stimulation to be characteristic of the German and Greek middle-class samples. We expected a mixture of both styles for the Costa Rican families. Thus, the first hypothesis states significant differences among the cultural communities in the display of parenting styles. If participants are categorized on the basis of their parenting style (by cluster analysis), the second hypothesis assumes that participants from communities with an independent orientation will be allocated to a different group than participants from communities with an interdependent orientation.

METHODS

Participants

The study included 193 mothers with infants from the five cultural communities previously described. Of these mothers, 116 lived in rural (and suburban for the Germans) areas and 77 in urban areas. Of the 193 mothers, 116 were primiparae and 77 were multiparae. Data collection took place when the youngest infants in the family were 3 months old. Gender distribution was held equal in all samples. All children were physically healthy. Contingent on the different physical environments as well as the population parameters and socioeconomic profiles of the cultural communities, we accepted a heterogeneous demographic structure of our subsamples. Descriptive information for all subsamples with regard to gender of the infants, age of mother and father, and educational level is provided in Table 1.

The Cameroon Nso sample. Infant mortality rate is highest among all included cultural communities at 102 per 1000 live births in 1996 and 95 in 1999. Because the fertility rate among the Nso in our study community is 3.3 per woman (5.4 is the national figure), the majority of infants were younger siblings (21 laterborn vs. 5 firstborn). In our sample, this is reflected in the low mean age of the mothers at the birth of the first child (19.8 years) as well as the mothers' mean age at assessment (26.7 years). The mean age difference between mothers and fathers (on the average, 8.7 years) at the time of assessment is larger than in any other of our samples. Yet, substantial age differences between wife and husband are normal in the Nso community as a result of arranged marriages and also partly due to polygamy. The recent introduction of mandatory schooling in Camer-

oon explains why the educational level of the mothers was slightly higher than that of the fathers (7.4 vs. 6.5 years).

The Indian Gujarati Rajput sample. Infant mortality rate is second highest among all our cultural communities at 77 per 1000 live births in 1996 and 70 in 1999. The fertility rate in our study community (3 per woman; 3.2 is the national figure) is the main reason why the majority of infants in our sample had older siblings (29 laterborn vs. 10 firstborn). Mothers and fathers mean ages were lower as compared to the other samples (22.6 vs. 26.6 years), and mothers also had low mean ages at the delivery of their first child (19.9 years) in comparison to the European and Latin American samples. The educational level in our sample was low. Mothers attended school on the average about half as long as their husbands (4.0 vs. 8.3 years), which represents the actual access to education in this area.

The Costa Rican sample. Infant mortality rate is substantially lower than the reported statistics for India and Cameroon, yet Costa Rica ranks third among our study communities at 15 per 1000 live births in 1996 and 13 in 1999. In Costa Rica women have, on average, 2.8 children. So also this sample is biased toward infants with older siblings (12 vs. 9). The mean age of mothers in our sample (29.6 years) and the age at the birth of the first child (26.7 years) were higher than expected. This could reflect social changes with respect to the adoption of a Western—mainly U.S. American—lifestyle and the introduction of a progressive health system (Rosabal-Coto, 2004). We did not have demographic information about the fathers in this sample.

The Greek sample. Infant mortality is relatively low in Greece, at 9 per 1000 live births in 1996 and 6 in 1999. The Greek sample consisted of two subsamples: mothers with infants from an urban environment (metropolitan Athens) and mothers from rural areas of Crete. As Greece has quickly developed from a traditional rural to an urban society, we chose to recruit more urban participants. The fertility rate in Greece is only 1.3 children per woman (lower in urban than in rural areas). This explains why we had more firstborn than laterborn children in a sample (36 vs. 15). The higher mean ages for mothers (29.4 years) and fathers (33.4 years) reflect the national figures. The majority of the participating mothers and their husbands had higher levels of education.

The German sample. Infant mortality rate in Germany is similar to that of Greece at 6 per 1000 live births in 1996 and 5 in 1999. The participants in the German sample were recruited from urban and suburban areas of the uni-

versity town of Marburg. Marburg is a slowly growing town of medium size (about 78,000 inhabitants) in the north of Hesse, in a highly industrialized region of Germany. As the fertility rate in Germany is on average 1.3, most children grow up as an only child. This explains why this sample was mainly made up of firstborn children. The mean age of parents of firstborn infants is 29.9 years for mothers and 33.1 years for fathers, which is consistent with the statistical average in Hesse.

The recruitment of participants depended on the local customs of the respective cultural communities. In rural communities, personal contacts with persons who held official positions with respect to community life like chiefs (head of villages) in Cameroon or dais (local midwives) in Gujarat were our basis for further admission. In urban communities, newspaper advertisements or information via hospitals were the basis of recruitment. The first contact in rural communities was always face-to-face and in urban settings generally by telephone.

Samples are drawn from rural (Greeks, Nso, Rajputs) and suburban (Germans) and urban (Germans, Costa Ricans, Greeks) communities to match the general socio-demographic profiles of the respective cultural communities. It was not possible to collect comparable urban and rural samples from each community for various reasons. For example, it was very difficult to pick out an urban middle-class sample among the Gujarati Rajputs because in Indian society caste and class are intrinsically intertwined. It turned also out to be extremely difficult to recruit urban middle-class Nso in Cameroon. In the same vein, it is almost impossible to find rural samples in industrialized societies that have comparable subsistence structures to traditional villages.

Procedure

The data were collected by different researchers in the five cultural contexts between 1996 and 1999. Standard procedures were used and implemented by researchers who were trained in interview techniques, videotaping, demographic assessment, and general cultural awareness by supervisors from the German coordination center of the study. The field researchers were either members of the cultural community under study or were prepared intensively for their work in the respective site by studying the historical, sociological, and geographical conditions and by learning the local language. For the latter group, a special training in culturally sensitive social behavior was coordinated and supervised by collaborating local scientists.

Information about the study was provided to prospective participants during the first contact. Families with an infant of the appropriate age were eligible to participate, and an appointment was made for a home visit. The families were informed that we were interested in infants' environments and infants' experiences in different cultures. It was especially emphasized that we wanted to observe normal daily life. We expressed our gratitude to the families to contribute to understanding the cultural variability of family relationships. The home visit started with a warm up and familiarization phase during which the procedure was explained, followed by an interview assessing demographic information. Thereafter, mother - child interactions were videotaped. All communication was done in the local language.

Because our intention was to examine a setting in every culture that allows the assessment of similarities as well as differences in parenting, we decided to focus on naturalistic free play situations. Mothers were informed that we were interested in what they consider as a normal play situation. They were free to use whatever objects, prompts, or toys they would like. These situations required the infant to be awake and fed, but there were no further specifications with respect to content or duration of the play situation. Although the studied cultural communities differ substantially in their definitions of the adequate care of small babies (Keller, Voelker, et al., in press; Keller et al., 2002; Yovsi & Keller, 2003), they all had an understanding of playing with a baby, as we tested in pilot assessments. Furthermore, in all languages, terms for playing with a baby exist (Lamnso: *seeri*; Gujarati: *chokra jode ramavu*, Greek: *peso me to moro*; Costa Rican Spanish: *jugar con un bebé*; German: *mit dem baby spielen*). Because we were mainly interested in culturally shared definitions of parenting, we accepted a possible bias with respect to social desirability, because this presumably expresses what is valued in a particular cultural community. The analysis of primary care situations would have restricted the range of observable parenting systems and would have resulted in systematic biases with respect to the prevalence of breastfeeding (Abels, 2002; Yovsi & Keller, 2003). To familiarize families with the videotaping procedure, we recorded care and other routine situations prior to the actual recording of the naturalistic free-play mother - infant interaction. These practice situations were not included in the video analysis. The range of recorded time of the naturalistic free-play sequences was between 9.1 and 20.8 min with comparable recording times across the different communities (Nso, 9.3 to 14.5 min; Costa Ricans, 9.2 to 13.4 min; Gujarati, 11.6 to 20.1 min; Greeks, 9.1 to 12.0 min; Germans, 12.6 to 20.8 min). All participants received a small gift as an acknowledgement of their participation.

Measurement and Assessment Methods

The videotaped free-play interactions were analyzed by means of a computer-based video analysis system. At first, the complete free-play interaction sequence was divided into 10-sec intervals. Then the 10-sec intervals of all mother - infant dyads were coded with the codes described in the following discussion. Contextual categories that refer to the position of mother and child and to the infant's state were first assessed. Intervals with an awake and positive versus an awake and negative (distressed) state of the infant were distinguished. Positive state intervals were analyzed concerning the activation of the four parenting systems. The positive state intervals comprised the following percentages of the interaction time: Nso, 88, 77; Gujarati, 51, 94; Costa Ricans, 79, 43; Greeks, 90, 15; Germans, 76, 54. The included parenting systems were coded as follows.

Body contact. To measure the activation of the parenting system body contact, the percentage of positive infant state intervals was registered in situations in which body contact dominated over no body contact. Body contact included the positions *holding, sitting, lap,* and *close proximity within arm length.* The percentage of time in terms of the number of intervals with body contact was calculated.

Body stimulation. All *vestibular, kinesthetic, motor,* or *tactile* stimulations as well as *upright holding* were coded per interval. The percentage of intervals with at least one kind of body stimulation was calculated.

Object stimulation. The activation of the parenting system object stimulation was assessed by the mere occurrence of object stimulation during the 10-sec intervals. The indicator was the percentage of intervals in which the mother tried to attract the attention of the infant with an object that was touched by her or the child.

Face-to-face exchange. For the parenting system face-to-face, we proceeded in two analytical steps. First, we registered the percentage of intervals in which the mother positioned her body and head to her infant in a way that allowed face-to-face exchange for at least half of the time of the interval (5 sec). The distance between their faces had to be neither too close nor too far away for eye contact, and the angle between the mother's face and body and the axis of the infant's shoulders was a maximum of 45 degrees so that the baby could simply look straight ahead or had not to move the head more than 45 degrees to have eye contact. In a second step, we evaluated actual eye contact in terms of the percentage of the face-to-face

intervals. This score was calculated from microanalytically assessed onsets and offsets of infant and mother looking at each other's faces. This method is described in more detail in Keller et al. (1999). The first score describes the provision of the face-to-face system, and the second score describes the factual eye contact behavior.

The inter-rater reliabilities (Cohen's kappa), based on a subsample of 10 mother - child interactions (two from each cultural community), were .85 for body contact, .90 for body stimulation, .99 for object stimulation, .85 for the amount of face-to-face exchange, and .84 for the amount of mutual eye contact. The coders were all blind to the hypotheses of this study.

Data Analysis

We first carried out a descriptive data analysis of the occurrences of the parenting systems in each cultural community. Analyses of variance were used to test for differences in parenting styles among the five cultural communities. Moreover, a hierarchical cluster analysis was computed using the four parenting systems as variables. Finally, to test the existence of culture-specific patterns, we analyzed whether participants from communities with an independent orientation were allocated to the same or a different cluster as participants from communities with an interdependent orientation.

RESULTS

Differences among the Cultural Communities in the Display of Parenting Styles (Hypothesis 1)

The mean percentages of occurrences of the parenting systems in the 10-sec intervals of the total samples (occurrences in intervals) as well as the percentages of participants who displayed the respective parenting system (occurrences in cases) are presented in Table 2 for the different cultural communities. Overall, the body contact system, the body stimulation system, and the face-to-face system are the most prominent parenting systems with percentages of occurrence in 52% to 54% of the interactional intervals in the total sample. Nevertheless, the differences among the cultural communities is substantial with respect to the amount of experiences in the respective systems that infants are exposed to. A multivariate analysis of variance with the five communities as independent variable and the four parenting systems as dependent variable was used to test whether these differences are significant. As the results show, there are indeed significant

TABLE 2
Occurrence of Parenting Systems in Percent

Parenting Systems	Sample Group	Occurrence in Intervals			Occurrence in Cases	
		<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	%
Body contact	Nso	26	100.00	0.00	26	100.00
	Gujarati	39	78.19	24.41	39	100.00
	Costa Ricans	21	74.08	31.30	21	100.00
	Greeks	51	32.59	32.97	39	76.47
	Germans	56	28.73	21.41	56	100.00
	Total	193	54.28	37.31	181	93.78
Body stimulation	Nso	26	87.09	12.17	26	100.00
	Gujarati	39	25.31	19.61	37	94.87
	Costa Ricans	21	81.94	17.69	21	100.00
	Greeks	51	57.78	22.07	51	100.00
	Germans	56	43.71	13.87	56	100.00
	Total	193	53.71	27.30	191	98.96
Object stimulation	Nso	26	8.66	18.23	12	46.15
	Gujarati	39	1.54	4.77	6	15.38
	Costa Ricans	21	12.90	24.29	9	42.86
	Greeks	51	39.74	32.61	41	80.39
	Germans	56	29.90	20.20	55	98.21
	Total	193	22.06	26.89	123	63.73
Face-to-face exchange						
1. Face-to-face context	Nso	26	48.86	27.78	26	100.00
	Gujarati	39	15.73	18.64	34	87.18
	Costa Ricans	21	36.18	17.55	21	100.00
	Greeks	51	70.41	26.80	50	98.04
	Germans	56	69.43	23.78	56	100.00
	Total	193	52.45	32.01	187	96.89
2. Mutual eye contact	Nso	26	18.53	19.23	22	84.62
	Gujarati	39	11.43	16.63	23	58.97
	Costa Ricans	21	57.17	27.88	19	90.48
	Greeks	51	43.76	27.58	49	96.08
	Germans	56	52.48	22.25	56	100.00
	Total	193	37.82	28.79	169	87.56

differences among the five communities, $F(16, 565) = 33.36, p < .001, \eta^2 = .40$. Subsequent univariate analyses were calculated to indicate the differences for the dependent variables separately.

The *body-contact* system shows significant differences among the five cultural communities, $F(4, 188) = 56.12, p < .001, \eta^2 = .54$. It is most pronounced in the Cameroonian Nso sample, it is prominent also in the Costa Rican and the Indian Gujarati sample, and much less prevalent in the Greek and the German sample. All participants from all cultural communi-

ties display body contact except about 23% of the Greek participants, $\chi^2(4) = 35.63, p < .001$. The relatively lower level of body contact in the Greek sample could be due to the fact that some mothers decided to place the infant in an infant seat for the play interaction. Although German and Costa Rican families also had infant seats, they did not use them in the free play situation.

The distribution of *body-stimulation* also shows significant differences among the cultural communities, $F(4, 188) = 66.03, p < .001, \eta^2 = .58$. There is a high percentage of body stimulation in the Cameroonian Nso and the Costa Rican samples. It occurs in about half of the intervals in the Greek and the German samples and is lowest in the Indian Gujarati sample. However, all mothers from all cultural communities used body stimulation except two Indian Gujarati participants.

The least prominent parenting system, which holds the largest variability among the cultural samples at the same time, is the *object stimulation system*. Again, there are significant mean differences among the communities, $F(4, 188) = 20.55, p < .001, \eta^2 = .30$. Almost all German and most of the Greek caregivers, but less than half of the Costa Rican and the Cameroonian Nso and only about 15% of the Indian Gujarati caregivers, display this system. Thus, there is a significant difference among the communities regarding the proportion of mothers who display object stimulation, $\chi^2(4) = 81.80, p < .001$.

The *face-to-face system*, positioning of infant and caregiver in a way that allows eye-to-eye contact, was most prevalent in the Greek and the German samples. In the Indian Gujarati sample, the face-to-face system is least prominent. There are significant cultural differences in the amount of face-to-face behavior mothers engage in, $F(4, 188) = 40.51, p < .001, \eta^2 = .46$. The vast majority of participants from all the cultural communities display the face-to-face system when interacting with their small babies. The few Indian and the Greek mothers who do not show face-to-face positions produce a significant cultural difference, however, $\chi^2(4) = 15.74, p < .005$.

Yet, the actual amount of *mutual eye contact* is distinctly less pronounced than the provision of a face-to-face context, but the majority of the caregivers in all cultural communities engage in mutual eye contact. Again there are significant differences in the amount of eye contact members of different cultures engage in, $F(4, 188) = 40.51, p < .001, \eta^2 = .37$.

Grouping Participants on the Basis of Parenting Styles (Hypothesis 2)

To be able to group the participants on the basis of their parenting styles that eventually support more independent or interdependent socialization

goals, we computed hierarchical cluster analyses. We used *linkage between groups* as cluster method on the basis of squared Euclidian distances. A sharp increase of the distance between merged clusters revealed an optimal solution of two clusters. Cluster 1 includes caregiving patterns that consist of extensive body contact, substantial body stimulation, a low face-to-face orientation, and very low object stimulation. Cluster 2 includes patterns that consist of a high amount of face-to-face contexts, a high amount of object stimulation, low body stimulation, and low body contact (see Table 3).

Hypothesis 2 conceives of significant differences with regard to the distribution of participants from different sociocultural contexts in the clusters. In fact, we can verify that 83% of Cluster 1 is made up of participants from Cameroonian Nso, Indian Gujarati, and Costa Rican mothers, whereas 95% of Cluster 2 consists of participants from the German and the Greek samples. As a χ^2 test shows, the distribution of the members of the cultural communities is indeed significantly different in the two clusters, $\chi^2(4) = 119.75, p < .001$.

A comparison between the clusters shows additionally significant differences with respect to the actual amount of eye contact. There was signif-

TABLE 3
Cluster Analysis Of Parenting Systems

Variable		Cluster 1		Cluster 2		F
		M	SD	M	SD	
Cluster variables	Object stimulation %	8.09	17.40	36.47	27.40	74.26
	Body stimulation %	59.78	32.63	47.45	18.60	10.31
	Body contact %	84.49	22.24	23.12	19.98	405.86
	Face-to-face exchange %	31.31	26.19	74.25	20.95	157.58
Additional variables	Mutual eye contact %	29.06	29.78	46.85	24.80	20.29
	Years of schooling mother	7.87	3.73	13.71	3.25	115.54
	Age mother	26.09	5.70	29.68	3.89	18.13
	Locality	86 rural (87.8%), 12 urban (12.2%)		30 rural (31.6%), 65 urban (68.4%)		73.05
	Birth order	33 firstborns (33.7%), 65 laterborns (66.3%)		83 firstborns (87.4%), 12 laterborns (12.6%)		69.34
	Sex of infant	46 males (46.9%), 52 females (53.1%)		49 males (51.6%), 46 females (48.4%)		2.12

Notes: Cluster 1: $N = 98$. Cameroonian Nso: $n = 26$ (100%); Costa Ricans: $n = 19$ (90.5%); Indian Gujarati: $n = 36$ (92.3%); Greeks: $n = 12$ (23.5%); Germans: $n = 5$ (8.9%). Cluster 2: $N = 95$. Cameroonian Nso: $n = 0$ (0%); Costa Ricans: $n = 2$ (9.5%); Indian Gujarati: $n = 3$ (7.7%); Greeks: $n = 39$ (76.5%); Germans: $n = 51$ (91.1%).

icantly more eye contact seen between mothers and infants who were classified in Cluster 2. We also compared the context variables years of mother education, age, locality (urban/rural), sibling status (firstborn/laterborn), and gender of the children. Except for gender, all these variables differed significantly between the clusters. Thus, the Cluster 1 parenting style seems to be prevalent in communities with a predominantly rural structure and in which mothers have a comparatively low educational background, are younger, and the infants are mainly laterborn. The Cluster 2 style seems to be more prevalent in communities with predominantly urban contexts and in which mothers have a comparatively high education level, are older, and most infants are firstborn.

DISCUSSION

We found substantial differences in the display of four parenting systems among different cultural communities and demonstrated the existence of two parenting styles, a proximal style related to interdependent (Cluster 1) and a distal style related to independent (Cluster 2) socialization goals that can be associated with different ecocultural environments. The prevalence of the proximal style, consisting predominantly of body contact and body stimulation as parenting systems, represents a pattern that could prompt an interdependent self as we argued in the Introduction. On the other hand, the prevalence of a distal style, consisting predominantly of face-to-face contexts and object stimulation, represents an early socialization pattern that could prompt the development of an independent self. The results for the Cameroonian Nso, the Indian Gujarati, the German, and the Greek samples are in line with our expectations. There is only one exception: the low body stimulation of the Indian Gujarati Rajputs. This result, however, can be explained by the poor health of the young women who are underweight and anemic to a large degree, so that they have to avoid high energy behaviors. For the Costa Rican sample, we had expected mixtures of the two. It turns out, however, that the Costa Ricans clearly belong to Cluster 1. Given the fact that our Costa Rican participants mainly belong to the lower socioeconomic level, the results thus confirm the association between the socioeconomic situation and socialization practices as has been documented in the literature (e.g., Palacios & Moreno, 1996). It is a powerful variable, however, when it coincides with education and other sociodemographic factors like the age of the mother and the sibling status of the baby. The results underline that for the understanding of early socialization processes, the context cannot be separated either from behavior or culture. The family environment constitutes the context in which the

child adopts, participates, and appropriates the local culture (Rogoff, 2003). The family environment, especially the educational level of the parents and the economic conditions (Hoff et al., 2002) as well as the age of the parents and the sibling position (and presumably also the gender, possibly at a later age) of the child (Chasiotis, Keller, & Scheffer, 2003; Greenfield et al., 2003; Keller & Zach, 2002; Zukow-Goldring, 1995), create socialization contexts that can be compared across cultures and societies. This view links to earlier cultural and anthropological approaches (e.g., Berry, 1980; LeVine, 1974; Whiting, 1980) that considered socialization goals as being fundamentally interconnected with ecocultural and economic context. We assume, however, that the children are not passive recipients of cultural codes, but actively participate in socialization processes, which can be conceived of dynamic systems in which cultural goals and practices are transformed as part of the intergenerational transmission (Rogoff, 2003). The analysis of the infants' part of these dynamics is a challenge for further studies. Moreover, studies assessing historical change as well as acculturation studies are needed to better understand transitional processes (Bornstein & Cote, 2003; Cote & Bornstein, 2003; Keller & Lamm, 2004).

In our study, we only concentrated on mothers as parents. Mothers are the primary caregivers in all cultures during this life stage. Mothers spend more time with infants than any other caregiver even in societies in which multiple caregiving is the cultural norm (Tronick, Morelli, & Ivey, 1992). Thus, a significant proportion of infants' experiences are influenced by interactional patterns with the mother during the first months of life. Moreover, studies revealed that interactional experiences with the mother could be more important than those with other caregivers during the early developmental stages. Munroe and Munroe (1980; Munroe, Munroe, Westling, & Rosenberg, 1997) demonstrated that only the frequency of maternal holding during the first year of life, not overall holding, seemed to be a factor in the child's affective outlook at age 5 and at age 12. However, this does not mean that fathers and other caregivers are not important. In fact, it has been demonstrated that infant mortality is substantially higher if the father is absent during the earliest developmental phase (Hill & Hurtado, 1996). The direct and indirect contributions of different caregivers, including fathers, grandparents, siblings, and other relatives and peers, to child development in diverse cultural contexts need to be further specified in future research.

The play situation we assessed could be differently typical for the cultural communities that we studied. However, play situations in normal day-to-day life are not very long, even in cultures with an early face-to-face and object focus. On the other hand, brief episodes of play also occur in cultural communities where play is not especially favored (Rogoff, Mistry,

Göncü, & Mosier, 1993). Yet, to understand fully the impact of infants' daily experiences, studies that register the experiences of infants outside the play context are needed.

We can assume that our samples represent culturally consistent parenting patterns. We have since assessed three samples in Cameroon and Germany each and two Costa Rican samples, which revealed the same clusters as the ones reported here (Keller, Yovsi, et al., 2004). Also a study using a different methodology (spot observations over a week) with Cameroonian Nso and Indian Rajput families revealed that both communities favor parenting practices that support interdependent socialization goals (Keller, Voelker, et al., in press). The consistency, however, is bound to the ecocultural characteristics discussed earlier and a particular zeitgeist. It is apparent, that parenting is an expression also of sociohistorical epochs and thus needs to change over historical time (Keller & Lamm, 2004; Rogoff, 2003).

The results of our study strongly advocate cultural awareness in developmental psychology. It has been argued repeatedly that textbooks of developmental psychology are inherently biased toward a Western perspective (Lamb & Keller, 1991). Over the last decades, many researchers have worked on the idea of development as being organized in pathways that adhere to different socialization goals (Cote & Bornstein, 2000; Greenfield et al., 2003; Keller, 2003) and thus different conceptions of the self (Greenfield & Suzuki, 1998; Greenfield et al., 2003; Keller & Eckensberger, 1998; Keller & Greenfield, 2000; Shweder et al., 1998). The formation of a relationship with significant others is certainly a first integrative developmental task in all cultural environments. It is also evident that, although human beings may have a common biologically based behavioral repertoire, specific cultural environment will reinforce or suppress different components (Greenfield, 2002). This view implies that cultural and biological forces are intrinsically intertwined and cannot be separated from each other. The human infant interacts actively with its cultural environment from the very beginning. However, parents are instrumental in this process (Cairns, 1991). Systematic research programs are needed to establish developmental psychology as the interface between biology and culture to integrate biological opportunities and constraints with cultural norms and values over the lifespan.

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