

## Developmental Consequences of Early Parenting Experiences: Self-Recognition and Self-Regulation in Three Cultural Communities

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This study relates parenting of 3-month-old children to children's self-recognition and self-regulation at 18 to 20 months. As hypothesized, observational data revealed differences in the sociocultural orientations of the 3 cultural samples' parenting styles and in toddlers' development of self-recognition and self-regulation. Children of Cameroonian Nso farmers who experience a proximal parenting style develop self-regulation earlier, children of Greek urban middle-class families who experience a distal parenting style develop self-recognition earlier, and children of Costa Rican middle-class families who experience aspects of both distal and proximal parenting styles fall between the other 2 groups on both self-regulation and self-recognition. Results are discussed with respect to their implications for culturally informed developmental pathways.

There is a growing awareness that universal developmental tasks may be solved differently in different sociocultural environments (Greenfield, Keller, Fuligni, & Maynard, 2003; Keller & Greenfield, 2000; Shweder et al., 1998). Identification of culture-specific developmental pathways has relied largely on combining results from disparate studies conducted in different cultural communities. In the study described here, we examined the role of specific sociocultural environments by employing a prospective longitudinal design in three cultures. We studied the relation between early socialization experiences—in particular, maternal parenting style with 3-month-old babies—and aspects of the children's self-concept at 18 to 20 months of age—in particular, children's self-recognition and self-regulation. At about 3 months of age there is a biosocial behavioral shift that is recognized in different cultural communities (Emde & Robinson, 1979; Keller, Gauda, Miranda, & Schölmerich, 1985; Keller, Lohaus, Voelker, Capenberg, & Chasiotis, 1999; Saraswathi & Pai, 1997). The 18- to 20-month outcome represents a developmental transition in which self-recognition and self-regulation are developmental milestones (e.g., Bischof-Köhler, 1991; Kopp, 2001).

We assessed these behavioral patterns in cultural communities that differ with respect to their sociocultural orientations. Consistent with others (e.g.,

Fiske, Kitayama, Markus, & Nisbett, 1998; Markus & Kitayama, 1994), we assumed that sociocultural orientations are based on construals of the self. For our conceptual framework, we drew on Kağıtçıbaşı's (1996, 2004) proposal to differentiate the dimension of interpersonal distance reaching from separateness to relatedness, and the dimension of agency reaching from autonomy to heteronomy. Kağıtçıbaşı (2004) described the combinations of the poles of these dimensions as prototypes relating sociocultural orientations to the individual's self-construal. The resulting patterns that were relevant to our study are independence, interdependence, and autonomous relatedness. Independence is defined as comprising autonomy and separateness; the corresponding self is defined as an individual agent who is bounded, self contained, unique, and separate from others. The independent self is adaptive in Western, urban, educated middle-class families (Kağıtçıbaşı, 1996; Keller, Lohaus, et al., 2004). For our study, we selected a Greek middle-class sample from the metropolis of Athens, described as expressing prototypical independence (Gari & Mylonas, 2003; Georgas, 1989; Georgas, Bafiti, Mylonas, & Papademou, in press).

Interdependence is defined as comprising heteronomy and relatedness; the corresponding self is defined as a communal agent who is basically interconnected with others, role oriented, and compliant. Agency is assumed to be externally regulated (Greenfield et al., 2003; Kağıtçıbaşı, 2004). The prototypical interdependent self is adaptive in rural families with a lower socioeconomic and educational profile (Hoff, Laursen, & Tardif, 2002; Kağıtçıbaşı, 1996). For our study, we selected a sample from rural

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Cameroonian Nso. The Nso are one of the largest ethnic groups in the Western grass fields of the Republic of Cameroon that live in traditional farming communities. They have patrilocal settlement patterns with extended families or nuclear families with relatives living close by. They hold interrelated conceptions of family relationships, focusing on hierarchy, obedience, and respect (Nsamenang, 1992; Nsamenang & Lamb, 1994; Yovsi & Keller, 2003).

Autonomous relatedness is defined as comprising autonomy and relatedness; the corresponding self is defined as autonomous with respect to agency and related with respect to interpersonal distance. The prototypical autonomous-related self is adaptive in urban, educated, middle-class families in traditionally interdependent societies (Kağıtçibaşı, 1996; Keller, Lamm et al., 2004). For our study, we selected a Costa Rican sample from the capital San José. Urban educated Costa Ricans have been described as valuing relatedness in family relationships, stressing closeness, respect, and harmony (Rosabal-Coto, 2004), although the high standard of education supports autonomy.

The focus on particular communities within cultures that can be characterized by specific sociodemographic characteristics and sociocultural orientations accommodates the fact that there is considerable intracultural variability, especially with respect to childrearing beliefs, attitudes, and practices in different socioeconomic pockets of societies (Kusserow, 1999; Palacios & Moreno, 1996).

The apparent evidence for the impact of sociocultural orientations on socialization goals, parental beliefs, and parenting practices (e.g., Bornstein, Haynes, Pascual, Painter, & Galperin, 1999; Bornstein, Tal, & Tamis-LeMonda, 1991; Harwood, Leyendecker, Carlson, Asencio, & Miller, 2002; for a summary, see Keller & Harwood, *in press*) can be captured with the component model of parenting (Keller, 2002; Keller, Lohaus, et al., 2004). This model conceives of five independent parenting systems: primary care, body contact, body stimulation, object stimulation, and the face-to-face system. Previous studies differentiated two parenting styles: the proximal and the distal parenting style (Keller, 2003; Keller, Lohaus, et al., 2004). Emphasizing body contact and body stimulation forms a proximal style of parenting. Proximal parenting supports the development of a more interdependent self because body contact and interactional warmth support the development of acceptance of norms and values of the family, compliance, and obedience (Hetherington & Frankie, 1967; MacDonald, 1992). An emphasis on face-to-face contact and object stimulation forms a

distal style of parenting. Distal parenting supports the development of an independent self because face-to-face contact and object play have been related to the development of autonomy and separateness (Keller & Greenfield, 2000; Keller et al., 1999). The combination of distal and proximal parenting strategies supports the development of an autonomous-related self, with eye contact and object play supporting autonomy, and body contact and body stimulation supporting relatedness (Keller, 2003; Keller, Lamm, et al., 2004).

Based on cross-cultural differences in parenting styles (Keller & Greenfield, 2000; LeVine, 2002; Whiting, 1963), we propose that foundations of the self are differentially laid in cultural environments with different sociocultural orientations. We further propose that the different foundations have developmental consequences for the timing of children's next developmental tasks. Accordingly, children were expected to manifest selected behaviors at a precociously early age depending on the standards of different cultures (LeVine & Norman, 2001). The present study was thus aimed at exploring the development of self-recognition and self-regulation in terms of compliance as contingent on different parenting styles experienced during infancy. Studies on children's self-recognition established that toddlers between 15 and 18 months of age begin to respond to their mirror image as if they know that it is their own face (Lewis & Brooks-Gunn, 1979). Self referencing behaviors indicate that the child has acquired a categorical self-concept expressing that the self is a separate, physical entity and a source of actions, words, ideas, and feelings (Edwards & Liu, 2002). Mirror recognition assesses this capacity, which is independent of the child's familiarity with reflecting surfaces (Bischof-Köhler, 1989; Priel & DeSchonen, 1986). Based on our conception of culture-specific developmental pathways, we hypothesized that children's experience of distal parenting prevalent in cultural environments with an independent sociocultural orientation would support the development of separateness and autonomy. Thus, we expected these children to develop self-recognition earlier than children who predominantly experience proximal parenting typical for cultural communities with an interdependent sociocultural orientation.

Self-regulation refers to the development of children's ability to follow everyday customs and valued norms embraced and prescribed by their parents and others (Kopp, 2001). Self-regulation encompasses compliance, the ability to delay actions, and the modulation of emotions in response to contextual demands. Parents' childrearing styles play a critical

role in social development and the development of self-regulatory behaviors. Studies, however, have mainly assessed concurrent parenting behaviors whereas the parents' guidance of self-regulatory behavior begins during the child's 2nd year of life in many cultural communities (Kopp, 1982; Maccoby & Martin, 1983; Whiting & Edwards, 1988). Although the study of compliance has been one of the most active areas in toddler research, most of the research has been conducted in North American families (Edwards & Liu, 2002). Children's compliance in these studies was related to maternal correlates, mainly maternal warmth and low key control in interactive contexts. Mothers who display warmth, support, and guidance are more likely to get their toddlers to comply (Crockenberg & Litman, 1990; Kochanska & Aksan, 1995; Power & Chapieski, 1986). Furthermore, these maternal behaviors lead to the acceptance of norms and values and the development of compliance and obedience (Bandura, 1977; Hetherington & Frankie, 1967; Keller, 2003; MacDonald, 1992).

The parenting system that can be thought of as being functionally equivalent to warmth, support, and guidance is body contact (Harlow, 1958; Montagu, 1958; Oleson, 1998). We therefore hypothesized that children's experience of proximal parenting in cultural environments with an interdependent sociocultural orientation should support the development of relatedness and heteronomy. Thus, we expected children with these parenting experiences to develop self-regulation in terms of compliance earlier than children with the experience of distal parenting in cultural communities with an independent sociocultural orientation.

We expected children who experienced both styles, distal as well as proximal parenting, typical for cultural communities with an autonomous related sociocultural orientation to develop autonomy and relatedness at the same time. Thus, we hypothesized that these children develop self-regulation and self-recognition to intermediate degrees.

To summarize, the first goal of our study was to examine whether there are differences among the three cultural communities regarding styles of parenting in ways that mirror the sociocultural orientations of independence, autonomous relatedness, and interdependence. We hypothesized that parenting in the three cultural communities would be marked by a differential emphasis on behavioral systems that promote autonomy; in particular, we expected that the cultural communities would vary with respect to object stimulation and face-to-face contact. We hypothesized that face-to-face contact

and object stimulation would be displayed most often by Greek mothers, least often by Nso mothers, with Costa Rican mothers showing these behaviors somewhere in between. We hypothesized that parenting in the three cultural communities would be marked by a differential emphasis on behavioral systems promoting relatedness, especially body contact and body stimulation. We expected these parenting systems to be displayed most frequently by Nso mothers, least frequently by Greek mothers, with Costa Rican mothers being somewhere in between.

The second goal of the study was to examine whether there are cross-cultural differences in the developmental outcomes of 18- to 20-month-old toddlers. We hypothesized that differences in the cultural emphasis on autonomy would result in earlier development of self-recognition. We expected Greek 18- to 20-month-old children would recognize themselves more often in a mirror than would Nso children, and we anticipated that the Costa Rican children would fall somewhere in between. We hypothesized that differences in the cultural emphasis on relatedness would be expressed in earlier development of compliance. Thus, we expected Nso 18- to 20-month-old children would show internally regulated compliance more often than would Greek children, with the Costa Rican children somewhere in between.

The third goal of the study was to relate the behavioral development of the toddlers to the differential patterns of earlier parenting observed at 3 months. We hypothesized that, on an individual level, toddlers who had experienced a parenting style emphasizing autonomy during infancy that consisted predominantly of object stimulation and face-to-face contact would be more likely to develop self-recognition at 18 to 20 months. We hypothesized that, on an individual level, toddlers who had experienced a parenting style emphasizing relatedness during infancy that consisted predominantly of body contact and body stimulation would be more likely to develop internally regulated compliance at 18 to 20 months.

## Method

### *Participants*

Participants were recruited from the three cultural communities following local customs. All contacted families at all sites consented to participate with the exception of one single Costa Rican family. Across sites, a total of 116 families participated in Session 1 (when the youngest infant in the family was 3 months old); 90 of these families participated in Session 2 (when the infant was between 18 and 20

Table 1  
*Descriptives of the Sociostructural Characteristics of the Toddlers*

Culture	N	Age of child				Gender		Birth order		Context	
		T1		T2		Male	Female	First	Later	Urban	Rural
		M	SD	M	SD	N	N	N	N	N	N
Greece	46	3;5	0;6	19;2	0;15	24	22	34	12	46	0
Nso	32	2;28	0;6	18;27	1;6	12	20	10	22	0	32
Costa Rica	12	3;2	0;6	17;25	0;12	7	5	7	5	12	0
Total	90	3;2	0;6	18;25	0;27	43	47	51	39	58	32

Note. Age of child = months; days; Age = years; months. T1 = 3-month observation; T2 = 18- to 20-month observation.

months). The remaining 26 families were unavailable for Session 2 because of infant death or illness, or because the family moved to an unknown place. All children were physically healthy at the times of assessment. Of the final sample, 32 families lived in rural areas and 39 were multiparae. Additional demographic information is provided in Tables 1 and 2.

In the rural Nso community, the subdivisional officer contacted the Fon of Mbiame (sovereign of the region) to inform him about the study and solicit his permission and support. The families were then contacted through announcements in the Catholic and Protestant churches, social gatherings, and women's groups, as well as through personal contacts by the research team. In Costa Rica and Greece, local research assistants collaborated with hospitals in San José and Athens.

Fertility rates differed among the samples, thus affecting the relation of firstborns and later borns. The fertility rate in Greece is 1.3 children per woman, leading to more firstborns than later borns in the 46 families (of the original 54 tested) in the Greek sample. The national fertility rate among the Nso is 3.3 per woman so that the majority of the infants in the Cameroonian sample of 32 families (of the original 38) were younger siblings (22 later borns). Fi-

nally, the national fertility rate in Costa Rica is 2.8 children per woman, leading to 7 firstborns and 5 later borns in the final sample (of the original 24 families). Given the large sample loss from the Costa Rican sample, we compared the 12 families who continued with the 12 that did not and found no significant differences in sociodemographic characteristics or parenting behaviors.

#### *Apparatus and Procedure*

Between 1999 and 2002 (3-month assessment) and 2000 and 2003 (18- to 20-month assessment) local field researchers trained by the German coordination center collected the data in the local language. For the second assessment the families were contacted by phone (Costa Rica, Greece) or face-to-face (Cameroon). For both assessments families were visited at home. Following an initial warming-up phase, demographic information was assessed in an interview. Thereafter, a free-play situation with the mother and the baby was videotaped with 3-month-olds and the rouge test and the compliance tasks were conducted with 18- to 20-month-olds. Each assessment lasted approximately 1 hr. At the end the participants were given a small gift.

Table 2  
*Descriptives of the Sociostructural Characteristics of the Parents*

Culture	N	Age						Years of schooling					
		Mother			Father			Mother			Father		
		M	SD	N	M	SD	N	M	SD	N	M	SD	N
Greece	46	30	3;10	46	34	4;7	46	13	3;6	46	13	3;5	46
Nso	32	26	6;5	31	33	8;2	13	7	1;1	31	7	2;7	12
Costa Rica	12	27	5;1	12	32	7;2	11	9	2;1	12	—	—	—
Total	90	28	5;5	89	34	5;10	70	10	3;11	89	12	4;2	58

Note. Age = years; months.

### *Three-Month Assessment*

Although the cultural communities differ substantially in their definitions of the adequate care of small babies (Keller, Lohaus, et al., 2004; Keller, Voelker, & Yovsi, in press; Keller, Yovsi, & Voelker, 2002; Yovsi & Keller, 2003), they all had an understanding of playing with a baby, as we had tested in a pilot study. There are verbal labels for playing with an infant in all three languages (Lamnso: seeri; Spanish: jugar con el bebe, Greek: peso me to moro).

The mean recorded time of the free-play sequences was 8 min 44 s ( $SD = 2$  min 42 s) without any significant differences between cultural samples. The videotaped free-play interactions were analyzed by two coders with a computer-based video analysis system (Voelker et al., 1999). Using a time-sampling method based on 10-s intervals the four parenting systems that may occur during free-play situations (body contact system, body stimulation system, object stimulation system, and face-to-face system) were coded. Additionally, we coded whether mutual eye contact actually occurred. Episodes where the mother or child could not be clearly seen on the video were excluded from the analyses.

#### *Body Contact System*

Body contact included the following exclusive categories: holding (both feet or parts of one leg of the child are in contact with the mother), sitting (both legs of the child are in contact with the mother), lap (both legs and parts of the torso of the child are in contact with the mother), close proximity (the whole [or almost the whole] body of the child is in contact with the mother), and no body contact. Contact with the mother's hands was excluded from the system of body contact because it was coded in the body stimulation system. Categories were coded when they lasted for at least half of the interval. If several categories of body contact occurred within one interval lasting less than 5 s each, the middle body-contact position with respect to closeness was coded. The final score for the analyses was a ratio score indicating the percentage of 10-s intervals in which any kind of body contact occurred.

#### *Body Stimulation System*

Body stimulation included the following categories: vestibular (moving the whole body of the child while the head is held in a stable position), kinesthetic (moving the whole body of the child without holding the head), motor (moving body parts of the

child), tactile (touching the child), and caressing (stimulating the infant with the mother's face). Categories were coded when they occurred within a 10-s interval. The final score for the analyses is a ratio score indicating the percentage of 10-s intervals in which any kind of body stimulation occurred.

#### *Object Stimulation System*

The object stimulation system was defined as the maternal effort of attracting the attention of the infant to an object that was touched by her, the child, or both. The occurrence of object stimulation was coded when an object was used within a 10-s interval. The score used for the statistical analyses was a ratio score indicating the percentage of intervals in which object stimulation occurred.

#### *Face-to-Face System*

The face-to-face system was defined as the effort of a mother to position her body and head toward her infant in a way that allowed face-to-face interaction. The distance between their faces was neither too close nor too far 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 did not have to move the head more than 45 degrees to have eye contact. Face-to-face was coded when the mother created a situation like this for at least half of the interval. The score used in the statistical analyses was a ratio score indicating the percentage of 10-s intervals in which face-to-face was coded.

#### *Mutual Eye Contact*

Mutual eye contact was coded if eye-to-eye contact occurred between mother and child within an interval. The score used in the statistical analyses was a ratio score indicating the percentage of 10-s intervals in which mutual eye occurred. In some cases, it was not possible to code the mutual eye contact because of poor visibility on the tape (five missing values in the Greek sample, three in the Costa Rican sample, and four in the Cameroonian sample).

#### *Interrater Reliability*

The reliabilities for body contact and body stimulation, object stimulation, face-to-face system, and mutual eye contact were calculated on the basis of a subsample of 10 video sequences analyzed by the

two coders. To obtain a coefficient of agreement, Cohen's kappa was calculated and resulted in  $\kappa = .86$  for body contact,  $\kappa = .90$  for body stimulation,  $\kappa = .99$  for object stimulation,  $\kappa = .85$  for face-to-face, and  $\kappa = .83$  for mutual eye contact.

#### *Assessment of Self-Recognition and Self-Regulation*

Self-recognition was assessed with the standard procedure (i.e. the rouge test; Amsterdam, 1972; Bischof-Köhler, 1989). Self-regulation was assessed as compliance to prohibition (toddlers inhibiting a forbidden act) and compliance to requests (toddlers performing desired behaviors) separately (Kochanska & Aksan, 1995; Mischel, Shoda, & Rodriguez, 1989).

#### *Assessment of Self-Recognition*

For the rouge test, a mirror was used in which the child could see at least his or her upper trunk and face. After the child was confronted with the mirror for about 10 min, the mother blew the nose of the child, coloring it at the same time using a culturally appropriate red color (lighter red in Cameroon and darker red in Greece and Costa Rica). With this mark in the face the child was confronted with the mirror again. The second mirror confrontation was videotaped. One of the following four behavioral reactions of the child was coded (Bischof-Koehler, 1989): act to self (the child is pointing at or is trying to clean his or her nose), act to image (the child is pointing at or is rubbing the mirror image of his or her nose), look without acting (the child is looking into the mirror without any special reaction), and no special reaction (the child is doing something else, e.g., avoiding the mirror, not looking into the mirror, touching mirror exploratively). In a next step we collapsed the different behavioral codes of the mirror task into one dichotomous variable (self-recognition: yes for act to self vs. no for all other codes).

#### *Assessment of Self-Regulation*

*Compliance to requests.* In six separate tasks, the mother asked the child three times to bring an object to her and another three times to put an object away to another place or person (e.g., Crockenberg & Litman, 1990). The mother selected objects that were familiar to the child so that the child would know where to find them; they should be within reach of the child and emotionally neutral. It was also clarified that the child was able to understand the name of the object as well as the commands of the mother. When the child showed no reaction or reactions that had anything to do with the request, the mother was

instructed to repeat the request up to six times. When the child was still not reacting, the mother had to ask for the next task to be carried out without showing any sign of being negatively touched by the noncompliance of the child during the previous task. The mother was instructed not to interfere other than by repeating the request if necessary.

The behavioral reaction of the child was coded as one of the following mutually exclusive and exhaustive behavioral codes (e.g., Crockenberg & Litman, 1990; Kochanska & Aksan, 1995; Pipp-Siegel & Foltz, 1997): internally regulated compliance (the child performs according to the request without having to be reminded or coerced), externally regulated compliance (the child generally complies with the request but stops several times and has to be reminded at least once to finish the task), partial compliance (the child starts acting according to the request but is not coming to a correct end, e.g., bringing the wrong object or going to the wrong person), or noncompliance (the child does not follow the request). For each compliance to request task, one of the four category codes was given so that each child received six codes. For further analysis we calculated a ratio score that comprised the percentage of tasks carried internally regulated.

*Compliance to prohibition.* For this task the toddler was given attractive food items by the experimenter (to which the mother had consented) in a transparent container. The experimenter instructed the child not to open the container until she came back. Then the experimenter left the room for about 2 min. During this time the child was in the room with his or her mother and the second experimenter who was videotaping the child. When the child approached the container, the mother was instructed to remind the child not to take the food until the experimenter came back. She was asked, however, not to actively stop the child from taking the food (e.g., Kochanska & Aksan, 1995).

The behavioral reaction of the child after the experimenter left the room was coded according to a manual with the following three categories (Kochanska & Aksan, 1995): internally regulated compliance (the child is waiting without being reminded), externally regulated compliance (the child has to be reminded by the mother not to eat the food one or several times), or no compliance (the child is not waiting at all).

#### *Interrater Reliability*

For the rouge test and the assessment of compliance to prohibition and compliance to request, each cultural

sample was coded by trained research assistants who were native speakers. In the following, interrater agreements between the research assistants and the German coordinator are reported: Cohen's kappa values for the Greek coder were  $\kappa = .89$  (rouge test),  $\kappa = .89$  (compliance to requests),  $\kappa = .72$  (compliance to prohibition); for the Costa Rican coder were  $\kappa = .92$  (rouge test),  $\kappa = .85$  (compliance to requests),  $\kappa = .91$  (compliance to prohibition); and for the Cameroonian coder were  $\kappa = .78$  (rouge test),  $\kappa = .79$  (compliance to requests),  $\kappa = .80$  (compliance to prohibition).

## Results

In the following analyses of variance (ANOVA) and regression analyses we controlled for a set of variables that may be potential confounds. The variables concerning the toddlers are gender; birth order (firstborn or later born); and, if the dependent variable was an 18- to 20-month measure, age. The variable concerning the mother is education, operationalized as years of schooling  $z$  standardized within cultures. In the hierarchical regression analyses we entered the whole set of potentially confounding variables in Step 1; in all other analyses we entered the variables as covariates.

### *Analyzing Mean Differences for the Dimensions of Agency and Interpersonal Distance Across Cultures*

For the dimension of agency the ratio scores of the parenting systems object stimulation and face-to-face contact were entered as dependent variables in a three-level between-subjects multivariate analysis of covariance (MANCOVA) design. It is theoretically possible that Costa Rican toddlers are close to one of the two other groups with respect to the dependent

variable, whereas the Nso and Greek toddlers are expected to be significantly different. Therefore, a simple contrast was specified contrasting the Nso to the Greek sample. According to Wilks's criterion, there is a significant multivariate main effect of culture on the latent construct of agency,  $F(4, 164) = 10.27, p < .001$ . To test specific effects, we performed univariate analyses, which revealed that cultural differences hold for both variables: object stimulation and face-to-face contact. As shown in Table 3, both dimensions are least frequently observed in Nso mothers, more often in Costa Rican mothers, and most often in Greek mothers. The simple contrasts comparing the Nso with the Greek sample turned out to be significant for both object stimulation and face-to-face contact.

For the dimension of interpersonal distance, the ratio scores of the parenting systems body contact and body stimulation were defined as dependent variables in a three-level between-subjects MANCOVA design. Again, a simple contrast was specified comparing the Greek sample with the Nso sample. According to Wilks's criterion, there is a highly significant multivariate main effect of culture on the latent construct of interpersonal distance,  $F(4, 164) = 19.04, p < .001$ . The univariate analyses indicate that there are significant main effects for both parenting systems: body contact and body stimulation. As shown in Table 3, both parenting systems are highest in Nso, lower in Costa Rican, and lowest in Greek mothers. The simple contrast is highly significant for body contact and body stimulation, indicating that Nso mothers score significantly higher than Greek mothers on both parenting systems. In sum, the results confirm the hypotheses addressing cultural differences in the parenting systems supporting agency and interpersonal distance.

Table 3

*Descriptives and Multivariate Analysis of Covariance (MANCOVA) Results for the Latent Constructs of Agency and Interpersonal Distance (N = 89)*

Variable	Nso			Costa Rica			Greece			$F(2, 83)$	CE
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>		
Object stimulation	2.75	7.82	31	11.83	16.19	12	40.31	33.94	46	18.10***	-34.98***
FtF system	53.54	24.35	31	59.91	23.15	12	74.23	24.77	46	3.86*	-16.36**
Body contact	100.00	0.00	31	65.00	32.99	12	31.30	34.31	46	45.86***	66.86***
Body stimulation	70.81	21.00	31	56.96	22.95	12	55.75	21.34	46	3.67*	13.51*

*Note.* Three-level (culture) MANCOVA with significant multivariate main effect for culture on agency (object stimulation and face-to-face [FtF]), Wilks's criterion  $F(4, 164) = 19.04^{***}$ , with gender, birth order, and education as covariates; and three-level (culture) MANCOVA with significant multivariate main effect for culture on interpersonal distance (body contact and stimulation), Wilks's criterion  $F(4, 164) = 10.27^{***}$ , with gender, birth order, Wilks's criterion  $F(2, 82) = 3.96^*$ , and education, Wilks's criterion  $F(2, 82) = 3.49^*$ , as covariates. CE is the contrast estimate of the simple contrast comparing the Nso sample with the Greek sample and its level of significance.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 4  
Frequencies of Self-Recognition

	Nso		Costa Rica		Greece		Total
	N	%	N	%	N	%	
Non-self-recognizer	30	96.8	6	50	14	31.8	50
Self-recognizer	1	3.2	6	50	30	68.2	37
Total	31	100	12	100	44	100	87

Note.  $\chi^2(2) = 31.71, p \leq .001$ . Chi-square reported is Pearson's chi-square because no expected frequency was below 5; the lowest was  $f_e = 5.1$  for Costa Ricans recognizing themselves.

#### Analyzing Differences in Toddlers' Behavioral Development: Self-Recognition and Self-Regulation Across Cultures

##### Differences in Self-Recognition

To analyze differences in self-recognition, we analyzed the distribution of children recognizing and not recognizing themselves in the three cultural communities using a chi-square test. Whereas the overall percentage of children recognizing themselves is 42.5%, it is only 3.2% in Nso toddlers, 50.0% in Costa Rican toddlers, and 68.2% in Greek toddlers. The differences in observed frequencies compared with expected frequencies are highly significant. Table 4 shows the frequencies of self-recognizers and non-self-recognizers separately for the three cultural samples.

##### Differences in Self-Regulation

The analysis of compliance was conducted separately for compliance to requests (toddlers performing desired behaviors) and compliance to prohibition (toddlers inhibiting an undesired act).

Analyzing compliance to requests, the percentage of internally regulated compliance across the six tasks was computed and entered as the dependent variable in a three-level between-subjects analysis of covariance (ANCOVA) design. Again, we specified a simple contrast comparing Nso with Greek toddlers. As shown in Table 5, there is a significant main effect for culture on internally regulated behavior,  $F(2,$

80) = 19.86,  $p < .001$ , confirming the hypothesis that Nso toddlers show internally regulated behavior more often than do Costa Ricans, who show internally regulated behavior more often than do Greek toddlers. Additional evidence stems from the significance of the simple contrast indicating that Nso toddlers show internally regulated behavior significantly more often than do Greek toddlers.

Compliance to prohibition was analyzed by looking at the distribution of the three behavioral alternatives (internally regulated compliance, externally regulated compliance, and noncompliance) using a chi-square test. As shown in Table 6, the overall percentages of internally regulated behavior (33.0%), externally regulated behavior (31.8%), and noncompliance (35.2%) are similar. However, there are substantial differences across cultural samples that turn out to be highly significant; most Nso toddlers (71.9%) show internally regulated behavior whereas most Greek toddlers (47.7%) do not comply with the prohibition.

To summarize, all analyses confirm the hypotheses regarding toddlers' behavioral development of self-recognition and self-regulation.

#### Relations Between Toddlers' Behavior and Parenting Experiences During Infancy Explaining Individual Differences in Self-Recognition

This hypothesis was tested by computing a hierarchical logistic regression analysis with the dichotomous

Table 5  
Descriptives and Analysis of Covariance (ANCOVA) Results for Internally Regulated Compliance to Requests (N = 87)

	Nso			Costa Rica			Greece			F(2, 80)	CE
	M	SD	N	M	SD	N	M	SD	N		
Internal regulation	.70	.29	31	.36	.34	11	.26	.26	45	19.86***	.45***

Note. Three-level (culture) ANCOVA with age, gender,  $F(1, 80) = 4.99^*$ , birth order, and education as covariates. CE is the contrast estimate of the simple contrast comparing the Nso sample with the Greek sample and its level of significance.

\*\*\*  $p < .001$ .



Table 6  
Frequencies of Compliance to Prohibitions

	Nso		Costa Rica		Greece		Total
	N	%	N	%	N	%	
Internal regulation	23	71.9	5	41.7	1	2.3	29
External regulation	3	9.4	3	25.0	22	50.0	28
Noncompliance	6	18.8	4	33.3	21	47.7	31
Total	32	100	12	100	44	100	88

Note.  $\chi^2(4) = 41.80, p \leq .01$ . We used Craddock and Flood's (1970) approximate chi-square test because the expected cell frequencies are below 5 for all types of behavior in the Costa Rican sample.

variable self-recognition as the dependent measure. In the first step, the possible confounds were entered, and in the second step, the hypothesized predictors object stimulation and face-to-face context were entered. To assess the significance of the overall model fit, we used the chi-square-distributed measure *G* (Cohen, Cohen, West, & Aiken, 2003). Adding the second set of predictor variables in Step 2, the overall model fit reached significance,  $G(6) = 21.40, p < .01$ , and the overall goodness of fit increased to Nagelkerke's  $R^2 = .30$ . As Table 7 shows, the likelihood ratio (LR) chi-square test is significant, indicating that the second set of predictors contributes significantly over and above the first set of predictors (Cohen et al., 2003). The coefficient is significant for object stimulation; the high odds ratio of  $\exp(B) = 2.71$  indicates that the more object stimulation the children experience during early childhood the more likely it is that they recognize themselves at 18 to 20 months. The coefficient for face-to-face contact does not reach significance.

In a second hierarchical logistic regression analysis, we included mutual eye contact instead of face-

to-face contact in Step 2 to rely on the actual experiences of the child. The drop in the number of toddlers (from 86 to 74) is because in some cases mutual eye contact could not be coded, as explained in the Method section. Adding the second set of predictors (i.e. object stimulation and mutual eye contact), the overall model fit becomes highly significant,  $G(6) = 29.82, p < .001$ , Nagelkerke's  $R^2 = .45$ . The LR chi-square test indicates that the predictors contribute significantly over and above the first set of variables. Again, the regression coefficient for object stimulation,  $B = 1.28, \text{Wald}(1) = 12.71, p < .001, \exp(B) = 3.60$ , indicates that the more object stimulation the infants experience the more likely it is that they recognize themselves at 18 to 20 months. As hypothesized, the coefficient for mutual eye contact becomes significant as well,  $B = .66, \text{Wald}(1) = 3.86, p < .05, \exp(B) = 1.93$ , which means that the more mutual eye contact the children experience the more likely it is that they recognize themselves at 18 to 20 months.

The results indicate that the parenting system of object stimulation is a stable predictor of self-recognition, whereas it is the actual occurring mutual eye

Table 7  
Parenting Systems of Agency as Predictors of Self-Recognition ( $n = 86$ )

Variable	<i>B</i> at entry	Wald	Exp( <i>B</i> )	Final <i>B</i>	Wald	Exp( <i>B</i> )	$R^2$	<i>G</i> ( <i>df</i> )	LR ( <i>df</i> )
Step 1									
Age	-0.10	0.17	0.90	-0.22	0.64	0.80	.118	7.89 (4) <sup>†</sup>	
Gender	0.02	0.00	1.02	-0.24	0.23	0.78			
Birth order	-1.15*	5.80	0.32	-0.51	0.82	0.60			
Education	0.21	0.85	1.24	0.07	0.09	1.08			
Step 2									
Object stimulation				1.00***	11.05	2.71	.296	21.40 (6)**	13.51 (2)**
FtF system				0.04	0.02	1.04			

Note. Coefficients were entered simultaneously in the two logistic regression models. Predictors were *z* standardized before entering the regression.  $R^2$  is Nagelkerke's  $R^2$  reported for each regression. *G* (*df*) is the model chi-square with its degrees of freedom. LR (*df*) is the hierarchical likelihood ratio test suggested by Cohen, Cohen, West, and Aiken (2003). FtF = face-to-face.  
<sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 8  
*Parenting Systems of Interpersonal Distance as Predictors of Internally Regulated Compliance to Requests (n = 87)*

Variable	$\beta$ at entry	Final $\beta$	Adj. $R^2$	$\Delta R^2$	$F$	$df$
Step 1						
Age	.03	.12	.09	.13	3.06*	4, 82
Gender	.27**	.28**				
Birth order	.16	-.04				
Education	.17	.17 <sup>†</sup>				
Step 2						
Body contact		.47***	.30	.22	13.47***	2, 80
Body stimulation		.11				

Note. Variables were entered simultaneously at each step.

<sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

contact rather than face-to-face contact that influences the occurrence of self-recognition at 18 to 20 months.

#### *Explaining Individual Differences in Self-Regulation*

*Explaining individual differences in compliance to requests.* To test our hypothesis regarding compliance to requests, we computed a hierarchical regression analysis. We used the percentage of tasks carried out internally regulated as the dependent measure, entering the set of confounding variables in Step 1 and the predictors body contact and body stimulation in Step 2. The final model accounts for 30.0% of the variance, almost entirely attributable to the predictors entered in Step 2. As Table 8 shows, the regression coefficient is significant for body contact but not for body stimulation. If in the Step 2 body stimulation was entered as the only predictor, its regression coefficient would be significant ( $\beta = .23$ ,  $t = 2.16$ ,  $p < .05$ ). This allows the conclusion that body stimulation does contribute to the explanation of compliance, but this effect is overridden by the effect of body contact. Of the confounding variables, gender is significant. This is in line with the literature that provides accumulated empirical evidence that girls act internally regulated earlier than do boys.

*Explaining individual differences in compliance to prohibition.* Because the three alternative behavioral categories of compliance are qualitative, we analyzed this single compliance task with a multinomial logistic regression analysis controlling for the same set of confounding variables as previously. The behavioral category internally regulated was chosen as the baseline group: The first of the two resulting logistic regressions contrasts internally regulated behavior with externally regulated behavior, and the second regression contrasts internally regulated

behavior with noncompliance (Cohen et al., 2003). The overall model fits well,  $\chi^2(12) = 38.42$ ,  $p < .001$ , and body contact is a significant predictor for the behavioral category in both regressions, contrasting internal regulation behavior to external regulation,  $B = -1.85$ ,  $Wald(1) = 12.79$ ,  $p < .001$ ,  $\exp(B) = .16$ , with internal regulation to noncompliance,  $B = -1.84$ ,  $Wald(1) = 12.74$ ,  $p < .001$ ,  $\exp(B) = .16$ . In both cases there are highly significant negative  $B$  weights, indicating that the more body contact the child experienced the more likely he or she was to comply internally regulated. Body stimulation, on the other hand, does not help contrast internally regulated behavior with one of the two behavioral alternatives. In sum, body contact turned out to be a stable predictor of toddlers' compliance, whereas support for body stimulation as a predictor is weak.

#### **Discussion**

Our study reveals evidence that maternal behavior in early infancy differentially socializes children's self-concept in toddlerhood. We identified three parenting styles that can be regarded as expressing different sociocultural orientations. First, the proximal parenting style stresses body contact and body stimulation. This style can be associated with an interdependent sociocultural orientation, emphasizing heteronomy and relatedness. Second, the distal parenting style stresses face-to-face exchange and object stimulation. This style can be associated with an independent sociocultural orientation, emphasizing autonomy and separateness. The third parenting style combines distal and proximal parenting. This style can be associated with an autonomous-related sociocultural orientation, emphasizing autonomy and relatedness. Furthermore, our data confirm differences in toddlers' behavioral

development. Greek toddlers demonstrate more self-recognition than do Cameroonian Nso toddlers, Cameroonian Nso toddlers show more self-regulation than do Greek toddlers, and Costa Rican toddlers are situated between these two groups with respect to self-recognition and self-regulation.

We also found that the development of self-recognition and self-regulation can be related to early parenting experiences. Children who experience a parenting style that stresses the proximal parenting systems demonstrate more self-regulation at 18 to 20 months of age on an individual level. Body contact turned out to be the central predictor for this relation. Children who experience a more distal parenting style demonstrate more self-recognition at 18 to 20 months of age on an individual level. It is the mutual eye contact rather than the face-to-face exchange that is important (see also Blain, Thompson, & Whiffen, 1993).

Thus, the results confirm our hypothesis that there are cultural differences in maternal parenting styles as well as in toddlers' developmental outcomes depending on the emphasis put on agency and interpersonal distance. A focus on autonomy and separateness translates into an emphasis on face-to-face exchange and object stimulation. With the face-to-face exchange, the parents provide a frame for mutuality. It represents the first behavioral system where the infant can exert control over the interactional exchange because the baby's looking behavior determines the onset and offset of mutual eye contact (Keller, Schölmerich, & Eibl-Eibesfeldt, 1988; Parke, 1978; Schaffer, 1992; Stern, 1985). Parents follow the visual incentives of the baby when they look where the infant is looking, thus establishing a joint focus of attention (Keller, 1992). During eye contact, parents tend to react within a very short interval (less than 1 s) to infant signals (Keller et al., 1999). This allows infants to relate the behavioral reaction of the parent to their own behavior, thus reinforcing the sense of autonomy and the experience of being a distinct and separate person.

The prominent role of object play also supports the development of a separate and independent self. Objects and toys direct the attention of the infant to the physical world and instigate curiosity and exploration. The emphasis on curiosity and exploration has been related to an independent sociocultural orientation (Rothbaum, Pott, Azuna, Miyake, & Weisz, 2000; Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000). Objects and toys are also considered as supporting the infant's ability to spend time alone.

The experience of distal parenting can thus be regarded as facilitating the development of self-

recognition that denotes the first direct expression of a separate and autonomous agency. Distal parenting initiates a developmental pathway toward an independent self construal.

A focus on heteronomy and relatedness translates into an emphasis on body contact and body stimulation (Keller, 2003; Keller et al., 2002). Bodily closeness promotes the feeling of unity and interpersonal fusion more than does the feeling of separateness. The infant's exposure to the bodily rhythms of the mother (e.g., when carried) can be considered as supporting interactional synchrony more than reciprocity. Synchrony as a developmental mechanism supporting relatedness has also been reported by Gratier (2003), who found that Indian mothers have significantly more overlapping vocalizations with their infants than do Euro-American mothers, who follow the quasidialogic pattern with on and off more (see also Keller, 2003). Furthermore, it can be speculated that the physical warmth that is apparent during body contact also conveys emotional warmth because it has been amply demonstrated that body contact comforts distressed babies. Warmth as an interactional construct, although heterogeneously defined in the literature (Keller et al., 1999; MacDonald, 1992), has been identified as a significant variable for the development of compliance and the acceptance of norms and values in a broader sense (Bandura, 1977; Hetherington & Frankie, 1967; Maccoby, 1984; Rollins & Thomas, 1979). Finally, the relation of touch and body contact to socioemotional development has a long tradition in psychology (Harlow, 1958; Montagu, 1986; Spitz, 1945).

The interpretation of body stimulation is more complex. It is a behavioral system that supports physical independence because it promotes the acceleration of motor development, especially gross motor milestones such as early walking (Field, 1998; Keller et al., 2002). The emphasis on acceleration of motor development is bound to ecocultural and economic factors when children are needed as helpers in the families as early as possible. Special strategies accelerating motor development have especially been described for sub-Saharan farming communities (Keller et al., 2002; Konner, 1977; Super, 1976). In these cultural environments, therefore, body stimulation is in the service of interdependent sociocultural orientations. On the other hand, substantial deceleration of motor development has also been reported from cultural environments that can be assumed to have interdependent sociocultural orientations such as the Mayan Zinacantec Indians from Mexico (Greenfield & Childs, 1977) or the Ache Indians (Hill & Hurtado, 1996). The small effect of

body stimulation on compliance to requests that disappeared as soon as body contact was entered in the regression may be due to the fact that, contrary to body contact, body stimulation may be a local (sub-Saharan African) strategy to support interdependent sociocultural orientations. The experience of proximal parenting can thus be regarded as facilitating the development of self-regulation. A developmental pathway toward an interdependent self-construal is instantiated.

A third pathway derived from Kağitçibaşı's (1996) conceptualization of the autonomous-related self cannot draw on empirical studies on developmental consequences of early parenting. We presented evidence for the coexistence of the poles of autonomy and relatedness with our Costa Rican middle-class sample. The emphasis on both autonomy and relatedness instantiates an autonomous-related pathway. However, further studies need to develop and test genuine conceptions of the autonomous-related pathway.

The empirical realization of the model of autonomous relatedness confirms the assumption that the two dimensions are not mutually exclusive. They can be considered independent in the sense that they predict differential developmental results. However, in every cultural environment, independence and interdependence are negotiated to different degrees. It is also evident that each individual's conception of the self expresses a combination of autonomy and relatedness.

Our study further confirms the component model of parenting (Keller, 2002). The different parenting systems reflect different patterns of behavior toward the infant on an intra- and cross-cultural level. Furthermore, specific systems can be theoretically and empirically linked to developmental outcomes during toddlerhood. With this, the model contributes considerably to the discussion of mechanisms involved in culture-specific socialization (Keller, 2003, Keller, Lohaus, et al., 2004).

The different socialization strategies find their expression in the precociousness (LeVine & Norman, 2001) within the developmental domains strived for in different cultural communities. In this study we looked at differences in maternal interactional behavior as a mechanism of toddlers' behavioral development. Earlier studies have demonstrated that, depending on the sociocultural orientation, parental expectations regarding the timing of developmental milestones differ (e.g., Goodnow, Cashmore, Cotton, & Knight, 1984; Joshi & MacLean, 1997; Keller, Miranda, & Gauda, 1984; Ninio, 1979; Pomerleau, Malcuit, & Sabatier, 1991). Cultural environments with

an interdependent sociocultural orientation emphasize a communal agenda and hierarchical social stratification. For them, it is important that toddlers learn norms and roles as early as possible. Cultural environments with an independent sociocultural orientation emphasize individual distinctness among equal social partners so that the early timing of self-recognition is mandatory. An implication of this view is that the developmental roots of similar behavioral achievements in different cultural communities may be different. Whereas in the context of an interdependent socialization agenda obedience to the parents may be the precursor of compliance, it may be the development of autonomy that is most emphasized in the context of an independent socialization agenda. The development of compliance is, accordingly, assumed to be rooted in the child's autonomy in the Western literature (Feldman & Klein, 2003), where compliance based on obedience is often regarded as immature. On the other hand, in contexts with an interdependent sociocultural orientation, obedience is more of a duty, expressing social maturity (LeVine, in press). Compliance is regarded as a sign of responsibility and an opportunity for displaying competence (Serpell, 1994). Compliance is part of social training and control (Keller, 2003). LeVine (in press) related the early compliance of Gusii infants and toddlers to the controlling and training of the Gusii mothers who use speech rarely and avoid praise. In cultural environments with an independent sociocultural orientation, social training and control are regarded as an interference into the child's behavior, as an infringement of the child's freedom and, as such, as a pathological condition for children's development (e.g., see Ainsworth's, 2004, cooperation vs. interference scale). As a consequence of these differences in shared meanings, the social regulation of noncompliance also differs across communities with different sociocultural orientations. Whereas it is considered as a moral transgression in traditional rural communities (Nsamenang, 1992), noncompliance is regarded as emphasizing children's developing skills as autonomous agents in Western middle-class families (Crockenberg & Litman, 1990; Kuczynski & Kochanska, 1990). Here, meeting an achievement standard or accomplishing a task such as fulfilling a request is based on the categorical self-concept with the beginning of self-reflective self-evaluation (Edwards & Liu, 2002). The individual decision of the individual child to be compliant is central for this conception. The child centeredness of parents with an independent sociocultural orientation (Keller, 2003; Rubin, Stewart, & Chen, 1995) may direct parental expectations,

evaluations, and responses to their children's abilities to exercise self-control by using different standards at different developmental stages and across varying contexts (Goodnow, 1995).

Our study also has several limitations. Although it is longitudinal, it addresses only a limited age span (i.e., the first 18 to 20 months). It is important to extend this age range in further studies to understand continuities and changes in developmental pathways. There are studies indicating that the maternal narrating style with the verbal child can also be related to different sociocultural orientations. Mothers with an independent sociocultural orientation use more of a mentalistic language, further stressing the individuality and agency of the child (Wang & Leichtman, 2000). Mothers with an interdependent sociocultural orientation more often emphasize the moral code and the social implications of behavior (Keller, Hentschel, et al., in press; Wang, 2001). It is also important to assess parenting styles beyond infancy to understand continuities and discontinuities in parenting across cultural environments. Future studies should also conceptualize the relation between sociocultural orientations and socioeconomic and demographic factors. The interaction between these dimensions needs to be further specified within and across cultures over the lifespan to understand better the interplay between culture and development.

Clearly, more work, on both individual and cultural differences, is needed. Future research should try to shed light on the way behavioral development is embedded and integrated into specific meaning systems.

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