Longitudinal association between child emotion regulation and aggression, and the role of parenting: a comparison of three cultures

Article

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Longitudinal association between child emotion regulation and aggression, and the role of parenting: a comparison of three cultures.

Short title: Cultural differences in child emotion regulation, aggression and parenting.

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Abstract

Background: The ability to regulate emotions is a key developmental achievement, acquired during social interactions and associated with better behavioral and social outcomes. We examined the influence of culture on child emotion regulation (ER) and aggression, and on early parenting practices, and the role of parenting in child ER.

Methods: We assessed 48 mother-infant dyads from three cultures (one UK, two South African (SA)), at three months infant age for maternal sensitivity during face-to-face interaction and responses to infant distress during daily life, and at two years for child ER strategies and maternally-reported aggression.

Results: There were cultural differences in child ER, and these were associated with differences in levels of aggression. Maternal strategies in response to early infant distress also differed by culture and predicted later child ER. Maternal sensitivity during face-to-face interactions was not associated with culture and showed no clear relationship with child ER.

Conclusion: Cultural differences in maternal responses to infant distress mediated differences in child ER that are, in turn, related to differences in child aggression.

Introduction

The capacity for emotion regulation (ER) is essential for healthy socio-emotional and psychological development. In particular, poor ER is associated with difficulties in social functioning [1] and externalizing problems [2], particularly aggression (e.g. [3]). Research on ER has focused on two dimensions: (i) reactivity, which concerns the latency and intensity of responses, considered a temperamental trait; and (ii) regulation, which concerns processes that modulate reactivity, and includes a range of acquired behavioral strategies (e.g., self-comforting, distraction, asking for help, and avoidance) [4,5]. Although innate and reflexive behaviors are prominent in infant regulation of distress or arousal (e.g., gaze aversion), caregivers have been found to be the main source of regulation during early development [6]. Further, because maternal sensitivity during social interactions has been found to promote infant ER skills [7], these interactions have been considered a privileged context for ER development.

Is it striking that, while there has been considerable research on parenting and ER in European and North American populations, evidence from other cultures has been largely lacking [8]. This gap is important, because parents' socialization of emotions is shaped by cultural beliefs [9]. Thus, in cultures placing a high value on inter-dependence, where obedience and respect for elders, as well as cooperation, are typically prioritized (e.g., East-Asian and some African societies), suppression of the expression of negative emotions is promoted from early infancy [10,11].This contrasts with cultures that value independence, or individuation, where infant self-expression is typically promoted, and parental responsiveness to infants' individual signals, including those indicative of distress, are the cultural norm [9,10].

Variation in cultural values and goals concerning infant development in general, and ER in particular, has important implications for parenting research. To date, the principal focus of

studies of ER, including those conducted in inter-dependent cultures [12,13], has been parental sensitivity during early social interactions, including face-to-face engagement. However, this context, where infants are generally in a quiet alert state, may not be the most appropriate. Thus, research increasingly demonstrates the 'specificity of effects' of parenting- that is, that different parenting skills, elicited in different contexts, are relevant to different child outcomes [14–16]. Accordingly, parental responses to infant negative emotion, particularly when occurring in more general contexts than social interactions, may be far more relevant to understanding the role of parenting in the development of child ER, and the influence of cultural differences in parents' values and aspirations. Because child aggression is a common outcome of poor ER, an understanding of the parenting and cultural mechanisms that influence child ER might also illuminate the development of cultural differences in child aggressive behaviour. Since aggression is highly prevalent in South Africa, particularly in urban contexts [17,18], investigation of these issues in the South African context, in comparison with a European population, could be especially illuminating.

The current study: The current study was designed to address gaps in our knowledge concerning cultural variations in child ER, and in maternal reports of child aggression, as well as in the role of parenting practices in ER development. Specifically, we compared three cultures in terms of parental sensitivity in the face-to-face context, and in two of these we also assessed parental responses to infant distress in a wider context. One was an English (Reading) sample, typical of populations in which parenting and ER development have previously been studied. The other two samples, from South Africa (SA), were selected to be culturally different from one another: one was a white Afrikaans-speaking sample from Stellenbosch, similar in parenting values to the Reading population; and the other was a black isiXhosa sample from a peri-urban area, Khayelitsha, near Cape Town, selected to exemplify the inter-dependent parenting value system [19].

Using all three samples, we first examined whether child ER *reactivity* at two years, assessed during a standard frustration task, differed by culture. Given the prominent temperamental contribution to this aspect of ER, we predicted no group differences on this measure. However, given cultural differences in values concerning child negative emotional expression, we did predict group differences in child ER *strategies*: specifically, that children from Reading and Stellenbosch would show active efforts to overcome frustration, because of the value placed on independence-individuation, and that children from Khayelitsha would make less active effort to overcome frustration, because of the value placed on interdependence and respect for authority, and the discouragement of the expression of negative emotion. In addition, we examined group differences in maternal reports of child aggressive behaviors, and whether specific ER strategies were associated with such reported behavioral problems.

In the second part of the study, we examined parenting at three months in two contexts, determining whether it differed by culture and whether it was related to later child ER: (i) maternal sensitivity during a face-to-face social interaction; and (ii), for the two SA samples, for whom wider data were available, maternal responses to naturally arising infant distress, as observed during unstructured daily life at home. In the latter case, we predicted specific differences between the two groups: we expected Stellenbosch mothers to show 'individuating' responses, with a higher use of those that acknowledge and seek to soothe infant distress; and, by contrast, we expected Khayelitsha mothers to discourage infant expression of distress. Finally, we predicted that these differences in maternal distress regulation strategies would mediate any impact of culture on infant ER.

Methods

***Participants*:** 48 mother-infant dyads (16 from Reading, UK; 15 from Stellenbosch; 17 from Khayelitsha; 23:25 male:female infants) participated in the study. For the UK sample,

mothers were recruited on the postnatal ward of the Royal Berkshire Hospital, Reading, to a pool of volunteers for child development research at the University of Reading. SA mothers were recruited via health centers and breast-feeding clinics. Infant mean age was 12.76 weeks (SD = 3.00) at the first assessment, and 23.53 months (SD = 2.85) at follow up.

Procedure: **Maternal sensitivity in social interactions.** When infants were three-months old, a female researcher visited participants' homes, and video-recorded five-minutes of mother-infant face-to face interaction.

Coding. Maternal sensitivity (i.e. appropriate, warm, and well-attuned responsiveness to infant cues) was scored by trained raters using standard 5-point scales from the Global Rating Scales of mother-infant interactions (GRS) [20][1]. The GRS have been widely used, including in UK [20,21] and SA populations [19,22,23], and the maternal sensitivity score found to be reliably associated with similar demographic and infant outcome measures in both cultures (e.g. maternal depression, infant attachment, efficacy of interventions) [19,22,23]. In common with methods used by other researchers examining cross-cultural patterns of responsiveness in mother-infant interactions (e.g.,[24]), the GRS are designed to ensure that coding of maternal sensitivity is comparable across cultures, by including key dimensions, such as expressions of maternal warmth and responsiveness, that are independent of their specific modality of expression (e.g., facial vs. touch). Since speech content, as opposed to maternal behavior, has been found *not* to influence infant behavior in a South African population similar to that in our study [25], and in line with our previous use of the scales in the South African context, coders did not take speech content into consideration.

Maternal behavior during infant distress. To capture infant distress, and mothers' responses to its occurrence, families in the two SA groups were visited on 20 occasions during two consecutive weeks, when the infant was three-months old. On each occasion,

[1] The coding manual or further information about the coding are available from LB/LM

mothers were asked to carry on with their usual routines, and 15 minutes of 'Spot' videos of the infants' daily lives were recorded.

Coding. Episodes of infant distress were identified from the Spot videos. Five mutually exclusive maternal behavioral strategies during these episodes were coded as present/absent on a 5-second time-base (the impact of the mother's response on the infant was not considered; further, as for sensitivity coding, speech content was not taken into account). Codes comprised two broad categories of maternal response, based on the literature concerning the non-effective or effective regulation of infant distress in early infancy [26]:
(i) Dismissal of distress (non-effective). This included *distraction* (e.g. showing a toy), *practical care-taking* (e.g. undressing the infant, changing his/her diaper) and *ignoring*.
(ii) Acknowledgment of distress (effective). This included *physical soothing* comprising two subcategories of feeding/providing a pacifier, and physical comforting (e.g. rocking, patting, stroking), and *social soothing* (e.g. talking, singing or shushing). We distinguished physical and social soothing strategies because African mothers have been found to be more physical vs. social during interactions with their infants [24,27].

Child emotion regulation (ER). At child age two years, ER in response to frustration in the Barrier Task of the Lab-Tab [28] was assessed in university research premises. The assessment involved the child being given an attractive toy to play with when seated at a table. After 30 seconds the toy was removed and, for one minute, was placed in full view, but out of the child's reach, behind a Plexiglass screen. Mothers were instructed to remain neutral, and not to interact with their child.

Coding. ER was assessed on two dimensions: *reactivity* to frustration, and ER *strategies*. The former included latency to distress (i.e. seconds between toy removal and first negative expression, and coded as no distress, early and late distress), and intensity of distress (scored on a 5-point scale: 0=no distress, 4=strong crying) [29]. Five child ER strategies were coded

on a one-second time-base as mutually exclusive behaviors, employing well-established categories [4,5,30]. These comprised: (i) active and constructive strategies, found to be associated with positive and adaptive outcomes for children [4,30]: *distraction* (attending to or manipulating an object, other than the toy itself); *attempts to obtain the toy* (the child's attempts to get the toy, either by him/herself, or by asking for help); and (ii) less directed and developmentally advanced strategies, previously found to be related to maladaptive child outcomes [5]: *self-soothing* (thumb-sucking, self-hug, hair-curling, eye-rubbing, and proximity-seeking); *avoidance* (withdrawal, freezing, escape/aversion - such as leaning back, arching back, attempting to get out to the high chair). Additionally, to capture the absence of any active directed effort, *passive gaze* was coded using two subcategories, i.e., gaze to the toy, and gaze to the adult (mother or experimenter).

Child aggressive behavior (AB). Mothers completed the aggression scale of the Child Behavior Checklist (CBCL) [31], which is widely used in research and found to be valid in different low income countries [32].

Reliability: Videos were coded by two trained English speaking researchers. 20% were independently coded. Interclass correlations ranged between 0.71 and 0.95.

Data Analysis: We used the R statistical package for all analyses. We used PCA to confirm coding schemes for infant and maternal strategies matched the structure of our observations (see Supplementary Information for details). We used generalized linear models to investigate group differences in demographic variables, and to test study questions. We used Binomial models for binary dependent variables (child gender, birth order), Gaussian models for continuous dependent variables (child and maternal age, maternal sensitivity and intrusiveness, child aggression and intensity of reaction to frustration), and Poisson models (using episode duration as offset) for count dependent variables (child ER strategies, and maternal strategies during infant distress). The only exceptions were the group comparisons

for maternal marital status, and education, for which we used Fisher's exact test (due to low cell counts), and child latency of negative reaction to frustration, for which we used ordinal logistic regression. We used Likelihood ratio tests (LRT) to assess the contribution of predictors to the fit of the models. When testing for mediation, given the small sample size, indirect effects were analyzed using the conservative Sobel test, to minimize the possibility of Type I errors, as indicated by Hayes [33]. To adjust for multiple testing, the false discovery rate method [34] was used to control for potential type I errors. A p-value <.050 was considered significant.

Results

***Sample characteristics*.** As shown in table 1, the groups were similar in terms of child gender and birth order, although UK children were younger than the other two samples. Compared to the other two groups, mothers from Khayelitsha were the youngest and least likely to be married or to have completed schooling. As our focus was on cultural, rather than demographic, differences, all analyses controlled for these maternal variables. Child age was controlled for in analyses that included the UK sample.

Child Emotion Regulation (ER) and Aggression (see LRT results in table 2)

Reactivity to frustration. There were no group differences in the latency or intensity of reactions to frustration.

ER strategies The PCA confirmed the five ER strategies coded (see Supplementary Materials for full details). Child ER strategies differed according to group: UK children showed the highest use of distraction, and the lowest use of self-soothing; and children from Stellenbosch showed the most attempts to obtain the toy, and the least avoidance. Finally, children from Khayelitsha showed the highest frequency of passive gaze.

Child aggression. A group difference was found in the CBCL aggression scores, with the UK children having the lowest scores, the Khayelitsha children the highest scores, and the children from Stellenbosch intermediate scores.

Association between ER and Aggression. With the exception of 'avoidance', all ER strategies showed a significant relationship with child aggression. Self-soothing (b=0.107, SE=0.014, p=<.001) and passive gaze (b=0.016, SE=0.005, p=.001) were associated with high aggression, whereas distraction (b=–0.027, SE=0.009, p=<.002) and attempts to obtain the toy (b=–0.062, SE=0.008, p=<.001) were associated with low aggression.

Maternal precursors of infant ER

Maternal sensitivity during early face-to-face interactions. Groups did not differ on maternal sensitivity (M(sd): UK =3.94(0.66); Stellenbosch=3.79(0.74); Khayelitsha=3.26(1.14)).

The relationship between maternal sensitivity and child ER, and the role of culture. There was a positive relationship between sensitivity and child passive gaze (b=–0.190, SE=0.073, p=.009) in the whole sample, and moderation of this relationship by culture was not significant. All other relationships between sensitivity and child ER strategies were moderated by culture (see moderation results in table 3). Thus, in UK children, higher maternal sensitivity was associated with more use of distraction. Similarly, in the Stellenbosch group, high maternal sensitivity was positively associated with both child distraction and self-soothing. In Khayelitsha, by contrast, the opposite relationships obtained, with high sensitivity being associated with lower levels of distraction and self-soothing. A higher level of maternal sensitivity was associated with lower levels of child avoidance in the UK sample, and with fewer attempts to obtain the toy in the Stellenbosch sample.

Maternal strategies during early infant distress episodes. As for child ER, the PCA confirmed our coding scheme for maternal responses to infant distress, revealing three kinds of strategy: Dismissing-ineffective strategies, physical soothing strategies, and social

soothing (see the Supplementary Materials for details). Mothers from Stellenbosch and Khayelitsha differed in their strategies, with the former group using more social soothing, and the latter more dismissing strategies. No difference obtained in physical soothing (table 4).

The role of maternal strategies during infant distress in child ER. Analyses were then run to investigate whether the differences found in child ER between the two SA samples were explained by differences in the early maternal behavior. Mediation was shown in each case: thus, maternal social soothing accounted for the increased rate of child avoidance (indirect effect=1.165, SE=0.320, z=3.643, p<.001) and child attempts to obtain the toy (indirect effect=-0.659, SE=0.226, z=-2.916, p= 0.003) in the Stellenbosch group, with the effect of group, in each case, becoming non-significant when social soothing was included in the regression (indirect/direct effect ratio=0.952, and 0.719, respectively). Similarly, maternal dismissal of distress mediated the increased rate of child passive gaze in the Khayelitsha group (indirect effect=0.248, SE=0.127, z=1.960, p=.050, indirect/direct effect ratio=0.539).

Discussion

There has been little cross-cultural research on early ER and its possible parenting precursors and child sequelae. Our study aimed to address this gap, investigating differences between cultures in child ER and its association with aggression, and the role of early parenting in ER development. Children's ER strategies showed clear cultural differences. In Reading and Stellenbosch, both independent-individualistic cultures, children showed active strategies in the face of frustration, either distracting themselves by becoming involved with their environment (Reading), or by seeking to obtain the removed toy (Stellenbosch). In Khayelitsha, by contrast, where values of interdependency, and respect for hierarchy and role-based authority are prominent [9], and where children are discouraged from showing negative emotion [10], children reacted to frustration with passivity. Notably, the three populations also differed in terms of child aggression, and these differences were related to

the children's ER, with active child strategies being associated with low levels of reported aggression, similar to previous research [4,30], and child passive strategies with high aggression.

Our study was notable in examining the role of earlier parenting in the development of child ER, not only in the restricted context of face-to-face engagement, but also in the ecologically valid context of maternal responses to infant distress on repeated occasions during everyday life at home. Maternal sensitivity during face-to-face interactions did not vary by culture, and while associations were in the predicted direction in the UK, as for similar samples [7], no clear relationships between sensitivity and child ER emerged in the two South African groups. Somewhat intriguing findings emerged in the patterns of association between high sensitivity, passive gaze and aggression. Thus, for the overall sample, high sensitivity was associated with passive gaze. This might indicate that, independent of culture, sensitive responsiveness supports the child in managing frustration in an emotionally contained manner. The further association we identified, however, was between passive gaze and aggression, the former being a predominant feature of the Khayeltisha children, who also showed the highest level of aggression. A plausible interpretation of this association is that, in the absence of complementary active coping skills, passive gaze may represent a maladaptive coping strategy.

In contrast to sensitivity during face to face interactions, maternal strategies for responding to infant distress in the broader context of daily life (assessed in Stellenbosch and Khayelitsha) clearly varied by culture, and they systematically predicted child ER. Indeed, these maternal strategies mediated group differences in child ER behaviors. When mothers acknowledged and responded to infant distress, as they commonly did in Stellenbosch, using social soothing, children later used active ER strategies; and when mothers dismissed their infants' distress, as they more typically did in Khayelitsha, either by ignoring it or else providing care of a non-

soothing kind, their infants were more likely to be passive in the face of frustration. Notably, these parenting strategies were consistent with the different cultural values and goals concerning child behavior that characterize each population - that is, the promotion of child individuation and independence in Stellenbosch, and the reduction of negative expressed emotion in Khayelitsha. Unfortunately, our study numbers were too small to determine whether the differences between cultures in parenting strategies led to the different rates of child aggression by virtue of their effects on child ER. Nevertheless, the associations we identified are consistent with this hypothesis. It seems plausible, therefore, to suggest that although parents' cultural goals for ER may have been achieved, in Khayelitsha there may have been unintended negative consequences in terms of a high level of child aggression. Thus, while the children from Stellenbosch (and Reading) developed active strategies to help them cope with frustration, children in Khayelitsha did not manifest the same behavior, and this may explain their more frequently resorting to aggression. An alternative hypothesis, also consistent with the current findings is that, as negative child emotion and behavior become more challenging for parents with development, the early maternal dismissal of infant distress develops into harsh parenting, itself known to be associated with higher levels of child externalizing problems, and reported to be prevalent in South African parents [17]. Longitudinal research on a larger sample, including assessment of the development of parenting strategies in response to child negative emotion and behavior, will both elucidate these issues and highlight potential targets for preventive intervention.

Other aspects of our findings require comment. First, they suggest that a focus on face-to-face interactions is of only limited value in understanding cultural differences in children's ER [35,36]. Rather, they underscore the importance of examining parenting in a wider context, and in response to infant behavior of direct relevance to child ER (i.e. distressed behavior), a conclusion in line with theories concerning the specificity of parenting

effects [14–16]. Second, intriguing differences emerged between the two 'independent' samples: the children from Stellenbosch dealt with the frustration by pursuing their goal, whereas the children from Reading coped by distracting themselves; and the former group were more aggressive than the latter. Since we did not have 'Spot' data for the Reading sample, the parental contribution to these differences remains to be elucidated. Third, while our samples differed in terms of cultural values of independence and inter-dependency, it was also the case that Khayelitsha families differed from those in the other groups on demographic variables that are also associated with parenting and child behavior. Although we controlled for these differences in our analyses, it is possible that unmeasured demographic variables, such as rates of community stress, additional to cultural belief systems, contributed to differences in parenting. Finally, in spite of the strengths of our study, including its cross cultural design and the use of ecologically valid prospective observations of maternal behavior relevant to child ER, it is also important to bear in mind that our sample size was small, emphasizing the need for further replication of this work in larger samples.

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Table 1. Sample Characteristics.

		Group					Multiple Comparisons[a]		
		1. Reading (N=16)	2. Stellenbosch (N=15)	3. Khayelitsha (N=17)	X^2(df)	Sig.	1 vs. 2	1 vs. 3	2 vs. 3
	Children								
Gender (%(N))	**Male**	56.25(9)	26.67(4)	58.82(10)	4.096(2)	n.s.[b]	-	-	-
Age (Months) (Time 1) (M(sd))		2.12±0.09	3.45±0.27	3.37±0.51	71.081(2)	<.001[b]	<.001	<.001	n.s.
Age (Months) (Time 2) (M(sd))		21.77±0.82	24.38±4.16	24.43±1.85	10.373(2)	.006[b]	.008	.008	n.s.
Birth Order (%(N))	**First Born**	31.25(5)	53.33(8)	35.29(6)	1.767(2)	n.s.[b]	-	-	-
	Mothers								
Age at Recruitment (Years) (M(sd))		33.75±3.02	31.87±5.22	28.24±5.13	10.373(2)	.006[b]	n.s.	.003	.045
Marital Status (%(N))[b]	**Married**	93.75(15)	86.67(13)	35.29(6)		<.001[c]	-	-	-
Schooling (%(N))[b]	**Completed**	100.00(16)	100.00(15)	70.59(12)		.008[c]	-	-	-

[a] FDR corrected for multiple testing.

[b] Likelihood Ratio Test.

[c] Fisher's Exact Test.

Table 2. Child Reaction to Frustration, Emotion Regulatory Strategies, and Aggressive Behaviour Scores, according to Group.

		Group					Multiple Comparisons[c]		
		1. Reading	2. Stellenbosch	3. Khayelitsha	X^2(df)[a]	Sig.[bc]	1 vs. 2	1 vs. 3	2 vs. 3
Child Reaction to Frustration									
Latency (%(N))	**No Distress**	25.00(4)	33.33(5)	35.29(6)	1.632(2)	n.s.	-	-	-
	Early Distress	18.75(3)	0.00(0)	17.65(3)			-	-	-
	Late Distress	56.25(9)	66.67(10)	47.06(8)			-	-	-
Intensity (M(sd))		2.25±1.91	1.67±1.68	1.82±1.78	0.209(2)	n.s.	-	-	-
Child Emotion Regulatory Strategies (% of Time) (M(sd))									
Distraction		18.16±14.58	11.44±16.41	11.02±12.32	13.148(2)	.001	.040	0.005	n.s.
Self-Soothing		1.25±3.07	8.76±16.44	10.13±21.08	22.582(2)	<.001	<.001	.021	n.s.
Attempts to Obtain Toy		22.95±25.95	31.82±28.02	10.84±17.37	21.153(2)	<.001	.005	n.s.	<.001
Avoidance		26.98±21.90	10.35±10.02	21.27±16.16	42.393(2)	<.001	<.001	n.s.	<.001
Passive Gaze		30.65±18.45	37.63±21.40	46.74±19.86	13.779(2)	.001	n.s.	<.001	.005
Child Aggressive Behaviours (AB) (M(sd))									
CBCL AB scale		6.47±4.14	14.23±5.86	21.00±8.21	21.282(2)	<.001	.003	<.001	.003

[a] Likelihood Ratio Test.

[b] Controlling for child and maternal age, mother's marital status, and mother's education.

[c] FDR corrected for multiple testing.

Table 3. Moderation by Group of the Relationship between Parenting Style and Child Emotion Regulatory Strategies.

		Moderation		Simple Effects (b(SE))		
		X^2(df)[a]	Sig.[bc]	Reading	Stellenbosch	Khayelitsha
Sensitivity	**Distraction**	45.818(2)	<.001	0.522(0.127)***	0.705(0.174)***	-0.388(0.094)***
	Self-Soothing	81.443(2)	<.001	0.449(0.491)	1.634(0.251)***	-0.548(0.111)***
	Attempts to Obtain Toy	30.184(2)	<.001	-0.091(0.106)	-0.580(0.093)***	0.167(0.104)
	Avoidance	11.611(2)	.003	-0.311(0.104)**	-0.044(0.160)	0.137(0.074)
	Passive Gaze	0.746(2)	n.s.	-	-	-

[a] Likelihood Ratio Test.

[b] Controlling for maternal age, mother's marital status, and mother's education.

[c] FDR corrected for multiple testing.

*p<.05, **p<.01, ***p<.001

Table 4. Maternal Strategies during Infant Distress Episodes (% of Time), according to Group.

	Group			
	Stellenbosch	**Khayelitsha**	**X^2(df)[a]**	**Sig.[bc]**
Physical soothing	14.15±18.64	16.30±7.89	1.643(1)	n.s.
Social Soothing	45.06±28.14	23.74±21.61	69.068(1)	<.001
Dismissal of Distress	14.93±17.40	19.95±20.12	24.199(1)	<.001

[a] Likelihood Ratio Test.

[b] Controlling for maternal age, mother's marital status, and mother's education.

[c] FDR corrected for multiple testing.