Maternal Sensitivity and Warmth in Singapore: Cultural Insights from Comparing the
Ainsworth and Emotional Availability Scales

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Abstract

The convergence among measures of maternal sensitivity and warmth, and their associations with children's language ability and likeability by peers were examined. Participants were 167 mothers and their child aged 4 to 6 (55.7% girls) from the four major ethnic groups in Singapore (Chinese, Malay, Indian and Other). Latent Profile Analysis showed that 14.5% of the mothers were classified as sensitive and high in warmth, 53.9% as inconsistently sensitive and displaying some warmth, and 31.5% as insensitive and low on warmth towards their child. Sensitivity and warmth were not strongly and consistently linked to children's language ability and peer likeability ($-.35 < r < .16$), suggesting that they may not be key factors that contribute towards children's development in the Singaporean context.

Keywords: Maternal sensitivity, Maternal warmth, Culture

Maternal Sensitivity and Warmth in Singapore: Cultural Insights from Comparing the Ainsworth and Emotional Availability Scales

One of the core tenets of attachment theory emphasizes the importance of early caregiving experiences for children's development and well-being (Bowlby, 1969). An example of such caregiving experience is parental sensitivity, defined as the degree to which a caregiver is able to accurately perceive and interpret a child's signals, and respond contingently and appropriately (Ainsworth et al., 1978). Through extensive observations of mother-child interactions, Ainsworth et al. (1974) identified maternal sensitivity in the first year of an infant's life as one of the prime predictors of children's Strange Situation attachment classification by the end of the second year. Subsequent correlational and intervention studies have replicated the positive association between parental sensitivity and attachment security, though the effect sizes tend to be small (Bakermans-Kranenburg et al., 2003; De Wolff & van IJzendoorn, 1997). Cross-cultural studies have also shown that parental sensitivity in the preschool years is linked to attachment security, demonstrating that sensitivity continues to play an important role well beyond the first year of life (Posada et al., 2016). Like attachment security, maternal sensitivity is related to several beneficial outcomes in children's social and cognitive development, such as social competence, language acquisition, behavioral problems and emotionality (see a review by Deans, 2020).

Although research on parental sensitivity has spanned decades, most of the studies were based on samples from North American or other Western societies, resulting in a continued call for more research in less studied cultures (Mesman et al., 2016). This has nudged the field in that direction, culminating in a relatively small but growing body of literature on observed parental sensitivity in diverse non-Western contexts. Using the etic approach, observational studies on parental sensitivity were conducted in rural and underprivileged urban settings such as Indonesia, Iran and Yemen (Alsarhi et al., 2018;

Asanjarani et al., 2018; Rahma et al., 2018). The general consensus is that sensitive responsiveness can be observed in all of these cultures, based on Ainsworth's framework that allows for a variety of manifestations of sensitivity (Mesman, 2018b). But less is known about how parental sensitivity is related to children's developmental outcomes in these societies. In one of the first observation studies on maternal sensitivity in Singapore, a city state in Southeast Asia with a majority ethnic Chinese population, Cheung and Elliott (2016) found that preschoolers whose mothers were sensitive tended to be *less* well-liked by female peers, which is inconsistent with evidence showing that enhanced parental sensitivity predicts children's positive social development (Deans, 2020). Cheung and Elliott (2016) contended that the use of the Emotional Availability (EA) Scales (Biringen, 2008) in that study, with its focus on positive affective communication in the assessment of sensitivity, may have been less appropriate in the Singaporean context where emotional restraint, self-control and emotion suppression are common regulation strategies (Hurley et al., 2016). To illustrate, the EA sensitivity scale posits that an integral part of caregiver sensitivity involves "appropriate and positive affective exchanges...[with] clear and accurate perceptions of emotions, as well as responsiveness" (Biringen & Easterbrooks, 2012, p. 3).

The central position accorded to positive affective exchanges arises from the belief that emotional relationships are fundamental to adaptive human interactions, to the extent that emotional availability is even more critical than physical presence (Sorce & Emde, 1981). However, for a society like Singapore where emotional restraint is valued, and where parents do not routinely express affection towards their children through hugging, kissing and holding them (Quah, 1999), the absence of overt positive affect in parent-child interactions may have caused parents to be rated as less sensitive than they actually are. This might explain the negative association between maternal sensitivity and peer likeability reported in (Cheung & Elliott, 2016), when sensitivity was rated using the EA framework.

To probe the possibility of a measurement issue relating to maternal sensitivity, the present study seeks to re-examine the data from Cheung and Elliott (2016) by coding the mother-child observations using an alternative measure – the *Sensitive vs. Insensitive Scale* of the Ainsworth’s maternal care scales (Ainsworth et al., 1974). The Ainsworth sensitivity scale was selected for this study because it was developed using the original formulation of the construct. Crucially, it has been used successfully in several non-Western contexts, and is sufficiently flexible to allow for culture-specific behavioral manifestations and interpretations (Mesman et al., 2018). For example, the Ainsworth sensitivity scale describes how a sensitive caregiver’s perceptions of the child’s signals are not “distorted by his/her own needs and defences” (Ainsworth et al., 1974, p. 131), without dictating what that response should look like. This gives much room for scoring favorably parenting behaviors that would otherwise count as insensitive parenting in some non-Western cultures, such as being expressly unaffectionate yet highly attentive and responsive to the child’s needs even if those needs were met instrumentally.

Both the Ainsworth and EA sensitivity measures are firmly grounded in attachment theory, centering around Ainsworth’s definition of sensitivity with a clear focus on contingent and appropriate responses to a child’s signals (Bohr et al., 2018). The common theoretical framework and working definition employed by the two measures is an important consideration as they provide a strong basis for comparison. The key point of difference between both measures is the focus on positive affect for the EA sensitivity scale, as described earlier. For the Ainsworth scale, evidence for positive affect or warmth is not essential in the assessment of sensitivity, where parental warmth involves an expression of a parent’s acceptance and rejection conveyed through behaviors such as parental responsiveness, appropriate monitoring and positive affective communication (Khaleque, 2013; Ying et al., 2019). Foremost, the Ainsworth sensitivity scale identifies instances where

caregivers “organize their behavior in coordination with that of the child”, such that it is not a measure of “warmth, love, or general ‘goodness’” (Posada, 2013, p. 642). Ainsworth had also made a clear distinction between sensitivity and warmth. Whereas sensitivity pertains to the quality of caregiver’s response to the infant’s initiation, warmth is a general characteristic of the caregiver that may not be related to sensitivity (Ainsworth & Marvin, 1995). In support of this view, Bailey et al. (2017) showed that the factor *maternal positivity*, derived from a factor analysis of the 90-item Maternal Behavior Q-Set (MBQS), was the least strongly associated with the overall sensitivity score.

Nonetheless, this does not mean that warmth in itself is an unimportant parental characteristic. It is indeed featured in the *Acceptance vs. Rejection Scale* of the Ainsworth maternal care scales, but measured as a separate construct that is independent of sensitivity (Mesman & Emmen, 2013). Therefore, even as a positive emotional climate in a parent-child relationship may contribute towards children’s development, including a heavy affective component in the measurement of parental sensitivity risks diluting its conceptual clarity (Mesman et al., 2018). In order to effectively examine the correlates of parental sensitivity in relation to children’s developmental outcomes, particularly in an understudied culture, it is important to make a clear distinction between sensitive parenting and other constructs possibly indicative of “good parenting” like parental warmth. This is especially pertinent in a cultural context such as Singapore, where the behavioral manifestations and functional value of both parental sensitivity and warmth are less known.

Parental Warmth in Singapore

Although the definition of warmth encompasses emotional acceptance that can manifest in different ways, often times depending on one’s cultural background (Cheah et al., 2015), observation studies usually gauge warmth through easily observable behaviors such as how much a parent engages the child through hugs and kisses, praises and smiling (e.g.,

Alsarhi et al., 2018). In Singapore, few studies have explored how parental warmth is conveyed to children, and its effect on children's development. But based on the limited evidence, it does seem that parental warmth in the form of overt affection is not frequently shown by parents in Singapore (Quah, 1999), similar to what has been documented in other Asian societies such as Taiwan (Wang et al., 2015). Furthermore, Stright and Yeo (2014) found that parental warmth, operationalized as positive affective communication, was related to *both* behavioral and psychological control from the perspective of Singaporean children from 3rd to 6th grades. The finding that parental warmth can co-occur with both supportive and coercive forms of parenting highlights the complexity underlying the meaning of warmth in this cultural context. The present study thus explored the association between maternal warmth and children's language ability and likeability by peers as a way to provide clarity to its functional value, and its co-occurrence with maternal sensitivity.

The Present Study in the Singaporean Context

The present study focuses on Singapore, an understudied Asian society which gained international prominence for their students consistently stellar performance in mathematics, science and reading in the PISA (OECD, 2020), but much less is known about parenting and family dynamics against this backdrop of high academic achievement. Singapore is a developed sovereign city-state located in Southeast Asia, which was established as an independent nation in 1965 having been a British colony previously. Under the British rule, Singapore prospered in trade as an entrepôt port in the 19th century, attracting droves of immigrants from China and India who contributed to the workforce alongside native Malays. This historical context contributed to the multi-ethnic and multi-cultural society in Singapore at present, with ethnic Chinese (74.2%), Malay (13.4%), Indian (9.2%) and Other (e.g., Eurasians, 3.2%) forming the four main ethnic groups in Singapore (Department of Statistics, 2019). However, even with these ethnic roots, Singaporeans' self-identities generally do not

align well with the identities of citizens from where their ancestors had originated (e.g. China or India). In fact, Singaporeans are exposed to many Western ideals through the country's colonial history and the education system, where English is *lingua franca* and the key medium of instruction in schools. Hence, Singapore provides a unique cultural context where parenting and parent-child relationships may be examined, one that is distinct from other ethnically-homogenous Asian societies like China, Japan or South Korea where most of the parenting research has been done and published in this part of the world.

Similar to the work by Mesman (2018a), this study focused only on the Ainsworth sensitivity scale out of the four maternal care scales to preserve conceptual clarity. To further test the postulation that it was the explicit focus on positive affect that had made the EA sensitivity scale less culturally appropriate, the present study also included an observed measure of maternal warmth. This facilitated an in-depth understanding of the functional value of sensitivity and warmth in the Singaporean cultural context, by comparing the links between the two observed measures of maternal sensitivity, along with maternal warmth, and their associations with children's language and social development outcomes. The comparison between two observed sensitivity measures parallels the work by Dawson et al. (2018), who found a lack of alignment in the profile of a sensitive caregiver between the Ainsworth sensitivity scale and the MBQS, even though both instruments are designed to measure the sensitivity construct. In the present study, a parental self-report of sensitivity (Emotional Availability Self-Report; EA-SR) was also included in the comparison to examine how parents' perceived sensitivity aligned with the more "objective" observed measures, and its relations with the outcome variables.

In all, three research questions were addressed. First, the degree of convergence among the sensitivity and warmth measures was examined via bivariate correlations (RQ1). In view of the conceptual alignment between the Ainsworth and EA sensitivity scales, a

significant positive association was expected. Maternal warmth was further expected to be more strongly associated with EA sensitivity given the latter's explicit focus on positive affect.

Second, the correlates of sensitivity and warmth with children's language and social development outcomes were examined (RQ2). Two aspects of language ability were of interest – children's vocabulary (receptive and expressive) and pragmatic language skills, where pragmatic language pertains to the use language appropriately and effectively in social situations (Russell & Grizzle, 2008). Social development was operationalized as the degree to which children were liked by peers in preschool (peer likeability). The choice of these dependent variables was based on empirical evidence demonstrating their associations with parental sensitivity and responsiveness. For example, parental sensitivity at infancy was linked to better friendship quality in early childhood (McElwain & Volling, 2004). Maternal sensitivity was also related to a greater rate of growth in children's receptive and expressive vocabularies (Pungello et al., 2009), as well as their enhanced understanding of pragmatic language rules (Tamis-LeMonda et al., 2014). Because less is known about the functional value of maternal warmth in the Singaporean context (Stright & Yeo, 2014), the current associations between maternal warmth and children's language development and peer likeability were more exploratory in nature.

Finally, using Latent Profile Analysis (LPA), mothers in the present study were classified according to their levels of sensitivity and warmth, and child outcome variables were then examined in relation to these class memberships (RQ3). This analysis would further illuminate the role sensitivity *and* warmth play in children's development. Including the Ainsworth and EA sensitivity scales as indicators in the LPA would also provide insight on how observed Ainsworth sensitivity, EA sensitivity and warmth may align using a person-centered approach. Importantly, developing a profile of Singaporean mothers on account of

their sensitivity and warmth has not been done previously. This endeavor would help advance our understanding of the functional value of what is widely known as positive parenting strategies in Western societies, but in relation to children's developmental outcomes in the Singaporean context.

Method

This study was part of a larger project that examined the associations between maternal sensitivity, child shyness and children's language ability and likeability by peers. The study's methodology is briefly but sufficiently described in this paper, and readers are encouraged to refer to Cheung and Elliott (2016) for further details.

Participants

The sample consisted of 167 mothers and their child (55.7% girls) between 4 and 6 years old ($M = 5.58$, $SD = 0.56$), while mothers were between 24 and 48 years old ($M = 36.55$, $SD = 3.93$). Ethnic composition of the sample mirrored that in the Singaporean population to maximize generalizability, with an ethnic Chinese majority (76.0%), followed by Malay (6.0%), Indian (13.2%) and Other (e.g. Eurasian; 4.8%). The families were mainly from middle-income backgrounds, with about two-thirds of them living in government-subsidized flats compared to the national percentage of 81% (Housing & Development Board, 2019). Mothers were mostly married (94.6%) and highly educated (61.1% of them had at least a Bachelor's degree), with 56.9% of them in full-time employment. Mothers reported English as the first language for 88.0% of the children.

Procedure

Home and School Visits. The procedure has been approved by the Institutional Review Board of the National University of Singapore. The author and four trained undergraduate research assistants visited each mother-child dyad in their home, where mother-child interactions were observed along with the administration of language

assessments for the child. Each visit lasted for about 1.5 hours, which always began with a video-recorded 30-minute free play session involving the mother and child using a Playmobil® farm set and a Disney® 80-piece jigsaw puzzle. Each family received a S\$20 shopping voucher as a token of appreciation. The author also administered the peer likeability ratings in the children's preschools in the third quarter of the school year.

Measures

Maternal sensitivity. The adapted Ainsworth sensitivity scale (Mesman, 2018a) was used to code the mother-child free play sessions. This scale differed from the original by substituting references to “baby” with “child” to make it suitable for coding a preschool sample. Like the original measure (Ainsworth et al., 1974), it is scored on a 9-point scale (1 = *highly insensitive*; 9 = *highly sensitive*), but anchored with descriptions of maternal behavior at every point. For the original scale, only odd-numbered points are anchored with descriptions. Together with two research assistants who reached reliability (ICCs > .80 for all scales), the author coded the mother-child interactions using the Ainsworth sensitivity scale. Throughout the coding process, weekly meetings were held to conference selected cases in order to minimize coder drift. Inter-observer reliability was analyzed based on 24.8% (n = 41 out of 165 codeable tapes) of the video-records that were randomly selected. Intraclass correlation (ICCs; single rater, absolute agreement) was .76.

The adult sensitivity scale of the EA Scales 4th edition (Biringen, 2008) was also used. It is a global measure that assesses parental sensitivity on a 7-point scale (1 = *highly insensitive*; 7 = *highly sensitive*), with descriptions anchored at point “1”, “2.5/3”, “4”, “5.5/6” and “7”. The EA sensitivity scale is calibrated on a similar continuum as the Ainsworth sensitivity scale that ranges from “highly insensitive” to “highly sensitive”, with “inconsistent sensitivity” in the mid-range like the Ainsworth scale. Adults who are rated as inconsistently sensitive on the EA scale exude behaviors such as “positive statements,

smiling and interest” (Biringen, 2008, p. 27), but do so inconsistently or lacking in authenticity. While a score of 3 and below reflects insensitivity, a score of 5.5 or 6 is labelled “bland sensitivity”, accorded to a caregiver who is “good enough” but more bland in affect than a caregiver with a score of 7. The highest score is given to adults who use mostly positive and appropriate emotional communication with the child, displaying “warm smiles and giggles, interested eye contact, and comforting and playful physical contact” (Biringen, 2008, p. 24). The author completed EA coding for all of the mother-child dyads in this sample. Of these, 35 video-records (21.2%) were sent to the laboratory of Z. Biringen in the U.S. for an inter-observer reliability check. ICC was .82. Note that two core teams of coders completed the Ainsworth and EA codings at different times, minimizing the possibility of inflated correlations between the two sensitivity scores.

Finally, the 62-item Emotional Availability-Self Report (EA-SR; Biringen et al., 2005) was administered to obtain a maternal perspective of their sensitive parenting. To date, no published study seems to have reported on its use, though the 36-item Dutch version of the EA-SR has been used by Vliegen et al. (2009). That measure has five subscales – mutual attunement, child involvement, affect quality, intrusiveness and hostility. The first three subscales were moderately correlated (ranged from .30 to .44) with observed sensitivity (Vliegen et al., 2009), suggesting some convergence between certain components of the EA-SR with observed sensitivity. The version of the EA-SR used in this study is organized differently from the Dutch version, with 5 subscales that are labelled in the same way as the observed EA Scales (sensitivity, structuring, non-intrusiveness, non-hostility, child responsiveness, child involvement). Only the sensitivity subscale (11 items) was analyzed in this study. Examples include “when my child cries, I can understand why”, and “I find it hard to understand the needs of my child”, that were scored on a 5-point Likert scale pertaining to

how much mothers agreed with each statement (1= *I do not agree at all*; 5 = *I agree totally*).

A EA-SR sensitivity score was calculated by averaging the ratings. α was .71.

Warmth. Maternal warmth was coded by the author and two trained observers (reliability > .80) using the observation scheme described in Alsarhi et al. (2018), where warmth is expressed physically through hugs, kisses and smiles, and verbally through praising and using terms of endearment. Scores ranged from 0 (no warmth) to 4 (very high warmth). ICC was .77, based on double-coding 24.8% of the randomly-selected video-records.

Vocabulary. Children's expressive and receptive vocabularies were assessed using the Expressive One-word Picture Vocabulary Test (EOWPVT-4; Martin & Brownell, 2011) and the Bilingual Language Assessment Battery (BLAB; Sze & Rickard-Liow, 2010) respectively. The EOWPVT-4 consists of 190 test items in the form of colored pictures. In this study, children were asked to name each picture shown, and the test concluded when the child has made six consecutive errors. Correct responses were summed. The EOWPVT-4 has good internal consistency, with α s ranging from .94 to .97 for children between ages 4 and 6 (Martin & Brownell, 2011). α in this study was .96.

The BLAB is a 100-item receptive vocabulary test developed for bilingual children in Singapore. All items are graded for difficulty and administered in the same sitting. For each item, the child heard a word spoken by the researcher, and pointed to the quadrant in a picture that provided the best fit for the word. Correct responses were summed. The BLAB was administered to bilingual Singaporean children aged 5 and 6 with good internal consistency of .79 (Lee, 2016). α in this study was .88.

Pragmatic language difficulty. The Children's Communication Checklist-2 (CCC-2; Bishop, 2003) is a maternal report of children's language difficulty. It is established as one of the most comprehensive instrument, covering the most number of domains that are deemed

important in the assessment of pragmatics (Russell & Grizzle, 2008). A pragmatic difficulty composite is derived by averaging scores on the D, E, F, G, and H subscales of the CCC-2. These subscales represent *coherence*, *inappropriate initiation*, *stereotyped language*, *use of context* and *nonverbal communication* respectively. Each subscale contains seven items, rated on a 4-point frequency scale. A higher composite score indicates greater pragmatic difficulty. α was .83.

Peer likeability. This was assessed by asking individual classmates (peer raters) in a single one-on-one session how much they liked to play with each child participant, on a scale of 1 to 3. The author first introduced the rating scale through a practice trial (Cheung & Elliott, 2016). When the rating began proper, the author showed each peer rater a slip of paper with the name of the child being rated, while reading aloud the name written on the slip. The peer rater was to insert the slip into one of three envelopes with a sad face (score “1”), a neutral face (score “2”) and a happy face (score “3”), following the procedure by Asher et al. (1979). The peer rater’s gender was noted at the back of each slip. Ratings were averaged across raters, with a higher rating indicating better peer likeability. Such sociometric peer ratings have been shown to have good test-retest reliability (Jiang & Cillessen, 2005).

Results

Preliminary Analyses

Data screening. The data were screened for missing values, outliers and multicollinearity. For missing data, 16 children (9.6% of the sample) had peer ratings which were not differentiated by peer rater’s gender. Ten children (6.0%) had unusable CCC-2 scores as per scoring guidelines, either due to missing values in the sub-scales in excess of 20%, or had failed the inconsistency check (Bishop, 2003). Two video-records (1.2%) of mother-child free play were not codeable due to equipment failure. For EA-SR sensitivity,

there was one missing score (0.60%) for nine items, and two missing scores (1.2%) for two items. Little's MCAR test showed that the data were missing completely at random, $\chi^2(176) = 173.02, p = .55$. Given the small percentage of missing data which were mostly from the dependent variables, missing cells were not replaced with the assumption that pairwise deletion will likely not contribute to biased estimates (Tabachnick & Fidell, 2014). There was one outlying score each ($SD > 3.29$) for pragmatic language difficulty and expressive vocabulary, which were recoded to one unit above the next non-outlying score in order to minimize their influence (Tabachnick & Fidell, 2014). There was no multivariate outlier. Multicollinearity was detected for receptive and expressive vocabularies, consistent with the high bivariate correlation, $r(162) = .71, p < .001$. A "vocabulary" factor score was computed using both expressive and receptive vocabulary scores to be used in subsequent analyses.

Screening for covariates. The child's ethnicity, gender and the number of peer raters in each class were examined as potential covariates. For ethnicity, data were recoded to ethnic Chinese ($n = 120$; 71.9%) vs. non-Chinese ($n = 47$; 28.1%) due to the small cell sizes for Malay, Indian and Other ethnic groups. Ethnic Chinese children had better vocabulary scores, $t(163) = 4.45, p < .001, d = 0.75$; and less pragmatic language difficulty, $t(155) = -2.55, p = .01, d = 0.43$. The child's ethnicity was not associated with male peer likeability, $t(149) = 1.04, p = .30$; or female peer likeability, $t(149) = 0.49, p = .63$. The child's ethnicity was thus included as a covariate in subsequent analyses involving vocabulary and pragmatic language difficulty.

Although gender did not have an effect on vocabulary and pragmatic language difficulty, $t(163) = -0.50, p = .62$ and $t(155) = 0.56, p = .58$ respectively, it affected peer likeability ratings. Children tended to rate same-sex peers more favorably, $t(149) = 4.40, p < .001, d = 0.73$ for male peer likeability; $t(149) = -7.89, p < .001, d = 1.27$ for female peer likeability. The number of peer raters was found to be negatively correlated with male peer

likeability, $r(149) = -.25, p = .002$, and female peer likeability, $r(149) = -.24, p = .003$.

Child's gender and the number of peer raters were thus included as covariates in analyses involving peer likeability, and likeability by male and female peers were analyzed separately.

Main Analyses

RQ1: The associations among measures of sensitivity and warmth. The means and standard deviations of the study variables appear in Table 1, along with the bivariate correlations among them. Ainsworth and EA sensitivity scores were positively correlated, but EA-SR sensitivity was not related to the two observed sensitivity scores. Maternal warmth was positively correlated with Ainsworth sensitivity and EA sensitivity, but not with self-reported sensitivity. Unexpectedly, the correlation between Ainsworth sensitivity and maternal warmth ($r = .53$) was even higher than that between EA sensitivity and warmth ($r = .26$). A test of equality of dependent correlations showed that the two correlations were statistically different, $t(162) = 3.55, p < .001$.

RQ2: Associations between parenting variables (sensitivity and warmth) and outcome variables. None of the sensitivity and warmth measures were related to vocabulary and male peer likeability (see Table 1). Pragmatic language difficulty was negatively related to Ainsworth sensitivity, self-reported sensitivity and maternal warmth. Female peer likeability was only related to EA sensitivity – but in the negative direction – where higher EA was associated with lower female peer likeability.

Table 1

Descriptive Statistics and Bivariate Correlations Among the Study Variables

Variables	<i>M</i>	<i>SD</i>	Range	1	2	3	4	5	6	7	8
1. Ainsworth sensitivity	4.38	1.51	1 – 9	-	.34**	-.02	.53**	.16*	-.22**	.08	.11
2. EA sensitivity	4.83	1.21	2.5 – 7		-	-.07	.26**	-.07	.05	-.03	-.22**
3. EA-SR sensitivity	4.27	0.40	3 – 5			-	-.01	.06	-.32**	.004	-.08
4. Warmth	1.80	0.74	0 – 4				-	.02	-.16*	-.06	.11
5. Vocabulary	0	1	-2.72 – 2.62					-	-.35**	.03	-.05
6. Pragmatic difficulty	5.42	2.33	0.80 – 12.50						-	-.07	-.10
7. Male peer likeability	2.23	0.39	1 – 3							-	.17*
8. Female peer likeability	2.35	0.40	1.29 – 3								-

Note. ** $p < .01$. * $p < .05$.

RQ3: Latent class membership and group differences in child outcomes.

Given the lack of variability in EA-SR sensitivity, and the fact that it was not associated with the observed sensitivity measures (see Table 1), self-reported sensitivity was excluded from the LPA to improve the interpretability of the latent classes. LPA was conducted using *MPlus 8.4* with three indicators – Ainsworth sensitivity, EA sensitivity and warmth. Three models were fitted (2- to 4-class). Following recommendations by Nylund-Gibson and Choi (2018), model selection was based on AIC, BIC, adjusted BIC, entropy, Vuong-Lo Mendell-Rubin Likelihood Ratio Test (VLMR-LRT) and Bootstrapped Likelihood Ratio Test (BLRT). Fit indices are presented in Table 2, showing that the 3- and 4-class models were comparably favorable. Further examination of the expected values (estimated means for each class; Table 3 upper panel) show that a 3-Class model is the most interpretable, with sufficient cell sizes that would facilitate subsequent between-group analyses. The expected estimated mean values for the 2- and 4-class models are available upon request.

Table 2
Model Fit Indices for Latent Profile Analyses (LPA) Involving Observed Sensitivity and Warmth (N = 165)

Information Criteria	Number of Classes		
	2	3	4
LL	-801.24	-740.22	-601.51
AIC	1628.47	1516.43	1249.02
BIC	1669.00	1572.56	1320.74
Adjusted BIC	1627.84	1515.57	1247.91
Entropy	.86	.99	.99
VLMR-LRT <i>p</i>	< .001	.34	.80
BLRT <i>p</i>	< .001	< .001	< .001

Note. LL = log-likelihood; AIC = Akaike information criterion; BIC = Bayesian information criterion; VLMR-LRT = Vuong-Lo-Mendell-Rubin adjusted likelihood ratio test; BLRT = Bootstrap likelihood ratio test; *p* = *p* value.

As shown by the estimated means in Table 3 (upper panel), Class 1, with 24 mothers (14.5%), was characterized by “adequate sensitivity” on the Ainsworth scale, “bland sensitivity” on the EA scale, and high warmth. Class 1 was thus labelled *Sensitive-High Warmth*. Class 2 had 89 mothers (53.9%) with “inconsistent sensitivity” on the Ainsworth scale, between “inconsistent sensitivity” and “bland sensitivity” on the EA scale and some warmth, and was labelled *Inconsistent-Some Warmth*. Class 3, labelled *Insensitive-Minimal Warmth*, had 52 mothers (31.5%) who were rated as “insensitive” on the Ainsworth scale, at the lower end of “inconsistently sensitive” on the EA scale and showed minimal warmth.

Table 3

Estimated Means of the 3-Class Model (upper panel) and Estimated Marginal Means of the ANCOVA analyses (lower panel).

	Sensitive-High Warmth (n = 24; 14.5%)	Inconsistent Sensitivity-Some Warmth (n = 89; 53.9%)	Insensitive- Minimal Warmth (n = 52; 31.5%)
<u>LPA Expected Values</u>			
<u>(Estimated Means)</u>			
Ainsworth	5.71 (0.30)	4.64 (0.14)	3.33 (0.16)
EA	5.25 (0.28)	4.97 (0.12)	4.39 (0.16)
Warmth	3.04 (0.04)	2.00 (0.00)	0.89 (0.04)
<u>ANCOVA Estimated</u>			
<u>Marginal Means</u>			
Vocabulary	-0.18 (0.19)	0.09 (0.10)	-0.04 (0.13)
Pragmatic difficulty	4.75 (0.48)	5.35 (0.24)	5.80 (0.33)
Male peer likeability	2.15 (0.08)	2.28 (0.04)	2.18 (0.05)
Female peer likeability	2.47 ^a (0.07)	2.37 (0.04)	2.25 ^a (0.05)

Note. Estimated marginal means denoted by the same superscript are statistically different at $p < .05$. Standard error in parentheses.

ANCOVA was conducted to test for differences in vocabulary, pragmatic language difficulty, and peer likeability between the latent classes. Results showed no difference in vocabulary, $F(2, 159) = 0.93, p = .40$; pragmatic language difficulty, $F(2, 151) = 1.67, p = .19$; and male peer likeability, $F(2, 145) = 1.91, p = .15$. A difference was found for female peer likeability, $F(2, 145) = 4.19, p = .02$, partial $\eta^2 = .06$,

showing that mothers in the *Sensitive-High Warmth* group tended to have children who were more well-liked by female peers, compared to those whose mothers were *Insensitive-Minimal Warmth*. The estimated marginal means and *SEs* are shown in Table 3 (lower panel). For children whose mothers were in the *Inconsistent-Some Warmth* group, likeability by female peers did not differ from that of the other two latent classes.

Discussion

This study examined the associations between measures of maternal sensitivity and warmth, along with their correlates in relation to preschoolers' language ability and peer likeability. A profile of mothers based on their sensitivity and warmth was also generated. Overall results showed that although Singaporean mothers tend to exhibit little sensitivity and warmth, a combination of high sensitivity and warmth was associated with children being more well-liked by female peers.

In this study, the Ainsworth sensitivity scale has demonstrated good inter-rater reliability, with the full range of scores observed. A similar conclusion was made for the EA sensitivity scale, though none of the mothers was given the lowest score of 1. In general, Singaporean mothers in this sample tend to be inconsistently sensitive or insensitive. Mean Ainsworth sensitivity score was low (4.38), which roughly corresponds to a qualitative description of being "quite insensitive". Elsewhere, studies that have used the Ainsworth sensitivity scale have reported much higher means – 5.47 for mothers with preschoolers in Indonesia (Rahma et al., 2018) and 7.33 for mothers with children from 4 to 21 months old in Peru ($M = 7.33$; Fourment et al., 2018). Notably, these were disadvantaged samples in rural areas, where maternal sensitivity already tends to be lower (Mesman et al., 2012), as opposed to the current middle-class sample in a developed country. For EA sensitivity, the mean score of 4.83 straddles

between “inconsistent sensitivity” (score 4) and “bland sensitivity” (score 5.5/6). Although this is comparable to a mean score of 4.75 for a sample of Latvian mothers of preschoolers with a middle-class background (Skreitule-Pikse et al., 2010), it is considerably lower than a mean of 5.64 for mothers of adopted children in China (van den Dries et al., 2012).

Finally, mothers in the present study exhibited minimal warmth in the form of hugs, kisses, praises and smiling. This concurs with previous findings showing that Singaporean parents tend to not be emotionally expressive (Quah, 1999), and in line with the perceived value of exercising emotional restraint in the Singaporean context (Hurley et al., 2016).

The association between Ainsworth and EA sensitivity was positive but not strong ($r = .34$), with only 11.6% shared variance between them. This degree of association suggests some conceptual similarities between the observed sensitivity measures, which is expected because the development of both scales were heavily guided by attachment theory and Ainsworth’s definition of sensitivity (Ainsworth et al., 1978). However, this overlap is clearly less strong in the Singaporean sample compared to a European American sample involving mothers and their 5-month-old infants ($r = .66$; Bohr et al., 2018). Given the large degree of non-overlap, the Ainsworth and EA sensitivity scales are not sufficiently similar to be used interchangeably, a view that was also articulated by Bohr et al. (2018). Researchers need to be mindful of the nuances in each measure, and select one that is deemed to have good cultural relevance with the strongest theoretical links with the outcome variables of interest.

EA-SR sensitivity was not related to Ainsworth and EA sensitivity scores, putting in question the conceptual alignment between self-reported and observed sensitivity. Past research has also reported only a small degree of concordance between

self-reported and observed parenting practices (Hawes & Dadds, 2006), arising from inherent biases in self-reported measures. To illustrate, consider an item from the EA-SR: *I am able to attune to the needs of my child*. A sensitive mother might be able to identify what counts as optimal in meeting the child's needs and give herself a high score on this item. On the other hand, an insensitive mother, not knowing what is optimal for the child, may still erroneously think that she has satisfied the child's needs, because she is not good at reading the child's signals to begin with (Mesman, 2018a). This results in little variability in the scores, regardless of the parent's actual level of sensitivity. Given the discordance, self-reported sensitivity should never be used as an easy alternative for the more resource-intensive but objective observation methods. Nonetheless, self-assessments can still be useful as a screening tool in the clinical setting, where practitioners may benefit from knowing parents' self-perception that would provide a crucial inroad to effective interventions (Vliegen et al., 2009).

Interestingly, Ainsworth sensitivity was even more strongly related to warmth than EA sensitivity was. In fact, the degree of association between Ainsworth sensitivity and maternal warmth in this study ($r = .53$) is somewhat comparable with that reported by Alsarhi et al. (2018) involving a Yemeni sample ($r = .65$). The stronger correlation between Ainsworth sensitivity and warmth suggests that warmth could possibly convey a sense of acceptance of the child even in this cultural context where emotional expressivity tends to be more muted. A show of acceptance is therefore expressed not just through a parent's responsiveness (Ying et al., 2019), but also through overt positive affect towards the child.

On closer examination of the EA sensitivity coding, it becomes apparent that although the EA sensitivity scale has a strong affective tone, it is not akin to warmth. A large part of the assessment revolves around identifying a match in affective responding

between parent and child during interactions. For example, a mismatch in emotions, where parental behaviors exude much warmth that are not reciprocated by the child, would score in the range of “inconsistent or apparent sensitivity” (Biringen, 2008). According to the EA sensitivity scale, this implies that the parent is likely showing affection for the camera in a way that the child is not accustomed to, or that the display of affect is irrelevant or even in conflict with the child’s signals. In this case, the parent would likely score highly on observed warmth but in the mid-range (at best) for EA sensitivity. This would explain the smaller-than-expected correlation between EA sensitivity and warmth. Importantly, the finding of a weaker link between EA sensitivity and warmth partly refuted the postulation made by Cheung and Elliott (2016), about how the EA sensitivity scale was less appropriate for a Singaporean sample because of its heavy focus on affect. In fact, Ainsworth sensitivity co-occurred more consistently with maternal warmth than EA sensitivity, and both Ainsworth sensitivity and warmth reflected a positive aspect of parenting as implied by their associations with children’s less pragmatic language difficulty. Ainsworth sensitivity was further related to better vocabulary skills among children. This is in contrast to the negative connotation EA sensitivity seems to convey through its association with worse female peer likeability.

Overall, the low mean levels of sensitivity observed in this study, coupled with the inconsistent pattern of associations between sensitivity and children’s language ability and peer likeability across sensitivity measures, provide several insights regarding the cultural implications of parental sensitivity in the Singaporean context. First, in accounting for the low sensitivity scores observed with this sample of Singaporean mothers, it is useful to consider how parents and children negotiate their relationship. In Singapore, parental authority plays a central role in the organization of

parent-child interactions (Cheung & Sim, 2017), where parents are believed to know what is best for the child such that parenting behaviors tend not to revolve around children's likes and preferences. Parent-child relationships are also distinctively hierarchical, and the emphasis on *training* children for their advancement (Chao, 1994) necessitates parents being strict and controlling, matter-of-fact, and pragmatic. Thus, parenting practices are used as a means to ensure the most desirable outcomes for the child from the perspectives of parents and the society-at-large (e.g. academic achievement and subsequent financial stability in a highly competitive society), even if it means compromising the child's autonomy or the emotional relationship with the child. In a way, Singaporean parenting may draw some parallels with what has been observed in other non-Western cultures, where a hallmark of sensitive parenting may involve the caregiver taking the lead to direct children's activities to instil the appropriate values and behaviors (Yovsi et al., 2009), and where warmth is likely expressed through parental sacrifices and supporting the child instrumentally, such as preparing the child's favorite meal, or providing guidance and educational opportunities (Cheah et al., 2015). This also underscores the need to conduct naturalistic observations over long periods of time and across different settings like Ainsworth did, in order for varied expressions of sensitivity to become more apparent.

Thus, there is little expectation or incentive for parents to shape their own behaviors to suit the child's wishes, especially if the child's learning is at stake. For example, in the free play session in this study, parents were observed to be generally quite directive during the jigsaw puzzle play, which was designed to be somewhat challenging for the child. Parents seemed very invested in helping children complete what they considered to be a cognitive task, even though it was never framed as such by the researchers. Because the parents were usually task-focused and goal-oriented, the

interactions often came across as lacking sensitivity. This might explain the lower sensitivity scores observed in this study, where both Ainsworth and EA coding prioritize the importance of a child's signalling and the quality of responses to such signals. In the case of EA sensitivity, the degree of emotional matching during interactions is also particularly pertinent. However, this is not to say that none of these sensitive parenting behaviors were observed in this study. Based on a post hoc qualitative analysis of the video-records of the most sensitive mothers in this sample, it was found that the 5 mothers who were rated as very or highly sensitive on the Ainsworth scale (score 8-9) maintained a very high level of verbal and non-verbal back-and-forth with their child throughout the 30-minute free play. The mother was definitely available, attentive and quick to respond to all of her child's signals, and the interactions were clearly enjoyable for the dyad even in the absence of strong affective display. For the 20 mothers rated as highly sensitive on the EA scale (score 7), there was also a high level of verbal exchanges coupled with very strong shared positive affect. Hence, behaviors resembling sensitive parenting based on the two measures used to assess them were definitely observed in this sample, only they did not occur frequently, and they were not associated with children's development outcome in ways or magnitudes which theory might predict.

Using a person-centered approach, it was found that Singaporean mothers could be meaningfully classified based on their sensitivity and warmth towards their child. However, few mothers were sensitive *and* exhibited high warmth. Over half of the mothers in this sample were classified as inconsistently sensitive and showed some warmth towards their children, while close to one-third of the mothers were insensitive with minimal warmth. Children with mothers who exhibited adequate sensitivity coupled with high warmth was more well-liked by their female peers in preschool,

compared to those whose mothers were insensitive and showed minimal warmth. Note that with the inclusion of Ainsworth sensitivity, EA sensitivity and maternal warmth in the profiling of mothers, the negative association previously observed between EA sensitivity and likeability by female peers was reversed. This shows that the inclusion of two measures of sensitivity has improved the interpretability of the sensitivity construct, and maternal warmth likely conveys a sense of acceptance towards the child that is beneficial to their social development. This is despite the fact that both sensitivity and warmth are not frequently shown among Singaporean parents. The observation that sensitivity and warmth do represent positive aspects of parenting in this cultural context aligns with the findings from the only other study we know of that measured similar constructs in the Asian context, where maternal responsiveness and affect were linked to preschool children's higher degree of interaction engagement with the mother in urban areas of Korea (Kim & Mahoney, 2004). However, one caveat identified in this study is that the predictive value of maternal sensitivity and warmth may not be as strong and consistently observed across different outcome variables as theory would have postulated. Specifically, mothers who displayed varying levels of sensitivity and warmth did not differ in their language ability (vocabulary and pragmatic language) and likeability by male peers. Although children were more well-liked by their female peers when their mothers were sensitive-high warmth rather than insensitive and displaying minimal warmth, the effect size was small. Hence, both groups of children were well-liked by their female peers – the difference lies only in the *extent* of their likeability.

Overall, the present findings point to two key takeaways about sensitivity and warmth in Singapore. First, parenting behaviors suggestive of maternal sensitivity and warmth are observed in this cultural context, but they are not as common. By and large, parents are considered to be inconsistently sensitive or insensitive. Second, maternal

sensitivity and warmth have a positive functional value in this cultural context, but their effects are not consistently observed across all developmental outcomes examined in this study. Even where significant associations are observed, the effect sizes are small. Therefore, as much as sensitivity and warmth are important parenting attributes, they do not seem to stand out as key factors that contribute towards children's development in this cultural context. Given the importance of parental authority in Singapore (Cheung & Sim, 2014), parenting practices marked by a high level of control, rather than contingent responsiveness, might be more prevalent and more predictive of children's developmental outcomes (e.g., Stright & Yeo, 2014).

Strengths and Limitations

The strength of this study lies in the use of trained native coders in the assessment of sensitivity and warmth. This is preferable to using non-native coders who are not familiar with the nuances of parent-child interactions in this cultural context, and research has shown that compared to non-native coders, scores given by native coders tend to be more variable (Cheung & Elliott, 2016). Moreover, Ainsworth and EA coding was done by different core teams of observers, minimizing the likelihood of inflation of correlation. However, this study had used a 30-minute observation in a free play setting, as is typically used in the context of EA coding. This differs from the longer naturalistic observations usually employed for Ainsworth coding. The lack of competing demands for the parent in a free play session could have resulted in a pattern of sensitive responding that is less similar to that observed in day-to-day interactions. Finally, this study has focused exclusively on Singaporean mothers, and the results may therefore not generalize to fathers, or to parents from other societies. Nonetheless, it is important to focus on one particular less-studied sociocultural group as a starting point,

recognizing that even within Asia, there is much diversity in how parenting behaviors might be organized.

Directions for Future Research

In this study, the focus on maternal sensitivity represents only one narrow aspect of Singaporean child-rearing, without considering the role of other caregivers who may also feature prominently in child care, such as grandparents and live-in domestic helpers (Cheung & Hawkins, 2014). As suggested by Keller (2018), the nuclear family profile may be specific to Western industrialized middle class nations. In societies where non-parental figures also assume a large role in child caregiving, such as in Singapore, sensitive caregiving provided by these figures may make a significant contribution towards children's development. Future studies could examine how the sensitivity of non-parental figures may differ in strength and function from that provided by parental figures. For example, it will be interesting to see if non-parental figures such as grandparents tend to assume a more affective role relative to the parents, who may feel that they need to be strict to "train" the child (Chao, 1994) to attain academic excellence. Non-parental figures may then meet the affective needs of children in a compensatory way.

In addition, more research attention should be devoted towards understanding the constituent behaviors that make up the construct of sensitivity in this cultural context, through the use of emic approaches that are free from assumptions based upon the "Western" parenting framework. The quest should also continue to identify parenting behaviors that are important and more predictive of children's developmental outcomes in diverse cultural contexts. For example, it will be especially illuminating to examine the how parental control and warmth (beyond positive affective communication) are exercised and demonstrated in the Singaporean context, and

whether these constructs are more strongly associated with children's developmental outcome than parental sensitivity is.

Conclusion

The etic approach taken in this study might have overlooked some important nuances and contextual factors. Specifically, our understanding of what constitutes sensitive or good parenting in general is still limited by the existing theoretical framework and working definitions of sensitivity and warmth. Nonetheless, there is still much utility in using a widely-tested theoretical framework as a starting point to generate knowledge about parenting in understudied cultures, even if there exists inaccuracies or compromises. This strategy is important in identifying patterns that transcend cultures, which would help the field advance as a coherent whole. This view was also articulated by Chao (2001), when she cautioned against developing “mini theories” of child development that are specific to each culture. However, much as developmental science endeavours to identify a unifying theme that explains human behavior in a parsimonious way, one can and should still strive towards describing nuances in specific cultures to enrich our understanding of child development. This is done through identifying specific parenting behaviors that count as sensitivity in different contexts (Posada, 2013). It is the flexibility in these details that make theories more adaptable to different cultures, without throwing out the theory altogether. In view of the good range of scores observed in the Ainsworth sensitivity scale, and its association with language outcome variables in this sample, the Ainsworth scale seems to be a promising instrument for use in future work in Singapore. However, there is still insufficient evidence to conclude that parental sensitivity serves the same function as it does in different (non-Western) cultural contexts, and is beneficial for a wide range of child developmental outcomes. More research should be done to test this proposition

not just in Singapore, but in more diverse Asian contexts. The field will benefit tremendously from devoting more research resources and attention on less-studied contexts, in addition to the many studies that focus on cultures and sub-cultures in the Global North.

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