Crying in the Strange Situation Procedure: Comparisons Between East-Asian and Western Infants

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Abstract

Ainsworth and colleagues, who developed the Strange Situation Procedure (SSP), emphasized the importance of context in attachment research. However, cultural characteristics of infants' behavior during the SSP have not been explored in detail. This study examined whether East-Asian infants would differ in crying during the SSP from Western infants. If so, we further examined which episodes (e.g., separation and reunion episodes) East-Asian infants would cry differently from Western infants. This study compared three East-Asian samples, one Koran (n = 76) and two Japanese (n = 44 & n = 81), with two Western samples, one U.S. (n = 106) and one Czech (n = 63). The results consistently revealed that when infants were separated from their mothers for the second time and stayed alone in a strange room, both Korean and Japanese infants scored higher on crying compared to U.S. infants. Subsequently, when a stranger entered the room, all East-Asian infants also scored higher on crying compared to U.S. and Czech infants. Infants did not show different levels of crying in the reunion episodes, with the exception of one sample of Japanese infants that scored higher on crying compared to the Western samples of Czech and U.S. infants during the second reunion episode. The findings suggest cultural differences in infants' crying during the SSP.

Keywords: attachment, strange situation, infants, cultures

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Attachment theory is becoming popular in Korean, Japanese, and Western societies. For example, attachment theory and related research findings have been included in various psychology textbooks (e.g., developmental, social, clinical) in Korea and Japan. Although certified clinical psychologists, educators, and nurses study attachment theory in depth, the understanding of culture-specific characteristics of Korean and Japanese attachment relationships is still limited.

The strange situation procedure (SSP) assesses the quality of infants' attachment relationship with their caregivers. The SSP has been considered the "gold standard" of all attachment assessments. It was initially developed in the U.S. by Ainsworth and her colleagues (1978) as a standardized laboratory procedure, which includes eight episodes in a fixed order (see Table 1). Specifically, infants are introduced to a new strange room with their mothers (Episode 1); they play with new toys in the room with their mothers (Episode 2); they meet a stranger with their mothers (Episode 3); they are then separated from their mothers, staying in the room with the stranger (Episode 4); they are reunited with their mothers (Episode 5); they are separated from their mothers, staying alone in the room (Episode 6); they meet the stranger again (Episode 7); and they are reunited with their mothers again (Episode 8). In this study, we examined whether East-Asian infants would differ in crying from Western infants.

INSERT TABLE 1 ABOUT HERE

The development of the Strange Situation Procedure in Baltimore, the U.S.

Bowlby (1969/1982) described that infants are "strongly disposed to seek proximity to and contact with a specific figure and to do so in certain situations, notably when they are frightened, tired, or ill" (p. 371). These distressed moments of being "frightened, tired, or ill" are critical for observing infants' behaviors because Bowlby (1969/1982) theorized that, drawing upon the theory of evolution, the attachment relationship is an outcome of survival. For example, infants would be more likely to survive if they sought closeness to their caregivers in times of danger (e.g., an attack from predators).

Consistent with Bowlby's (1969/1982) theory, the SSP was developed to observe infants' interactions with their caregivers during the moment of their distress (Ainsworth et al., 1978). Before developing the SSP, Ainsworth conducted two intensive *home*-observation studies in Uganda and Baltimore (a city in the U.S.), stating:

> Despite many similarities between the two samples in regard to attachment behavior, three behavioral patterns that had been highlighted in the Ganda study emerged less strikingly in the American study: the use of the mother as a secure base from which to explore; distress in brief, everyday separations from the mother; and fear when encountering a stranger. Perhaps if stronger instigation were provided, the American babies might be induced to behave in much the same ways as had the Ganda infants. In the belief that these behaviors might be evoked more incisively in an unfamiliar situation than in the familiar home environment, the strange situation was devised (p. viii).

In sum, although observing the moment of distress based on Bowlby's theoretical framework is critical, Ainsworth et al. (1978) did not observe enough moments of distress in U.S. infants at home. Therefore, Ainsworth et al. (1978) decided to include stronger prompts (experiencing a separation from the mother in a strange place) "to activate and/or intensify infants' attachment behavior" (p. viii).

The Strange Situation Procedure as the Approximation of U.S. Infants' Lives

Ainsworth et al. (1978) mentioned that the episodes in the SSP were designed to approximate situations that many infants raised in U.S. ordinary families commonly experience in their lives. Specifically, the mothers whom Ainsworth et al. (1978) had met in the U.S. reported occasionally taking their infants to unfamiliar places, such as friends' houses, daycare centers, and babysitters' homes, where infants sometimes stay alone or with an unfamiliar person while these mothers go to another room to make a phone call or use the bathroom. "The strange situation was modeled on such common real-life experiences (Ainsworth et al., 1978; p. xiii)." Ainsworth et al. (1978) further acknowledged that the SSP episodes may not approximate the experiences of infants in non-Western societies. The authors described that, based on their observations of African infants in Uganda (Ainsworth, 1967), those African infants would not have a tolerance for the SSP.

Cultural Characteristics of Infant Behavior During the Strange Situation

Previous studies have reported a high degree of crying in East-Asian infants during the SSP. A series of studies conducted by Miyake and colleagues (1985; Takahashi, 1986; Ujiie & Miyake, 1985) administered the SSP in Japan, and one study (Ujiie & Miyake, 1985) used a crying scale developed by Ainsworth et al. (1978). The authors reported that Japanese infants cried more when left alone in Episode 6 compared to Ainsworth et al.'s (1978) U.S. infants (an approximately 4-point higher score on crying on a 12-point scale). In contrast, both groups of infants showed similar levels of crying in the other episodes (within 2 points during the other episodes).

However, in the international field of attachment research, Miyake et al.'s studies are no longer treated as comparable with other SSP studies because the separation episodes in their studies lasted longer than those in other studies (Mesman et al., 2016; van Ijzendoorn & Sagi-Schwartz, 2008). The SSP episodes are usually curtailed whenever the infant exceeds a

"mild" level of distress (see Takahashi, 1986, for details of the procedure). For example, although the entire Episode 6 was skipped for 10% (n = 6) of their cases, the remaining cases experienced Episode 6 for 110 seconds on average (ranging from 50 to 120 seconds; Takahashi, 1986). This length of infant-mother separation is considered too long for infants who cry intensely in the SSP. Hence, East-Asian SSP samples other than Miyake et al.'s sample should be revisited to examine whether East-Asian infants cry more than Western infants during the SSP.

The evidence of culturally different levels of crying during the SSP can also be estimated from previous studies that have examined patterns of attachment classifications. Specifically, according to meta-analytic studies (Madigan et al., 2023; van IJzendoorn & Kroonenberg, 1988), Asian infants are more likely to resist comfort offered by their mothers and are labeled as "insecure-resistant," unlike their Western counterparts. In Ainsworth et al.'s (1978) study, infants classified as insecure-resistant were likely to show higher levels of crying compared to infants classified as the other insecure pattern: insecure-avoidant. In addition, one Korean and four Japanese infant attachment studies have been conducted and published in English, and all these studies had a higher proportion of infants with an insecure resistant attachment than infants with other insecure patterns: avoidant and disorganized (Durrett et al., 1984; Jin et al., 2012; Kondo-Ikemura et al., 2018; Takahashi, 1986; Umemura et al., 2022). However, this insecure-resistant attachment is determined based on the degree to which infants resist interacting with their caregivers but not the degree to which infants show crying. Therefore, comparing the proportion of infants with an insecure-resistant attachment does not provide direct evidence of cross-cultural differences in crying. Therefore, the present study directly assessed infants' crying during the SSP.

Jin et al. (2012) interpreted that the similarity between Korean and Japanese infants' attachment relationships could be due to infants' high distress during the SSP because both

cultures have less emphasis on mothers' separations from their infants and more emphasis on close stay with them compared to Western cultures (Doi, 1973; Kim & Choi, 1994). Specifically, there is a traditional belief in Korea, *maternal dews*, that mothers have an invisible, strong bond with their infants (Kim & Choi, 1994), while the Japanese concept of *amae* emphasizes children's dependence on their mothers (Doi, 1973). This Korean concept is, however, also unique from the Japanese concept. *Maternal dews* are believed to have special healing powers that enhance mental well-being and alleviate physical diseases, but *amae* does not emphasize this belief. For instance, Korean mothers have mythical beliefs that touching their infant's upset stomach can help soothe their discomfort. In sum, both Korean and Japanese concepts of staying close to one's infant exist, although they are not completely identical.

The Present Study

This study examined whether East-Asian infants show higher levels of crying during the SSP compared to Western infants. Ainsworth et al. (1978) stated that the SSP was originally developed for U.S. infants, not necessarily for infants in other cultures, which suggests that non-Western infants may feel more unfamiliar with the SSP episodes compared to Western infants. A previous Japanese study (Ujiie & Miyake, 1985) reported that Japanese infants cried more compared to U.S. infants when they were left alone in a strange room (Episode 6). Research should try to replicate this finding, especially because this Japanese study has not been treated as valid due to the deviation from the ordinary procedure of the SSP.

To examine our proposed research question, we used three East-Asian samples (one from Korea and two from Japan) and two Western samples (one from the U.S. and one from the Czech Republic). In addition, to avoid the possibility that high levels of crying would be

associated with the deviation from the SSP protocol, we also report the timing of curtailing separation episodes in the SSP for East-Asian and Western samples.

Hypotheses

H1: The Japanese samples would have higher levels of crying during the second separation episodes but not have significantly different levels of crying in the rest of the episodes compared to U.S. and Czech infants. We developed this hypothesis based on the findings of Ujiie and Miyake's (1985) Japanese study and expected to have consistent results.

H2: The Korean sample would have the same pattern of results that were found in Japanese samples, as we hypothesized H1. This hypothesis was generated because the Korean and Japanese distribution of attachment classifications were similar in the previous studies, and Jin et al. (2012) also interpreted that these similar results may be due to cultural similarities.

Method

Participants

Korean data. The Korean sample originally consisted of 87 infants and their mothers who lived in Taegu (Jin, 2005; Jin et al., 2012). Infants ranged in age from 12 to 18 months. The average age of the mothers was 29 years old, ranging from 26 to 37 years. Most participants were from middle and upper-middle-income families; specifically, 45.1% of the participants reported a middle-class income level (1,500,000 – 2,500,000 Korean Won), and 41% fell into an upper-middle income level (2,500,000 – 5,000,000 Korean Won). Most mothers reported that their education was above high school level; that is, 81% earned a bachelor's or graduate degree. In this sample, 21% of the mothers worked outside the home, with two mothers placing their infants in a daycare center and the remaining families raising their infants with the help of grandmothers or relatives. We lost data from 11 cases during the conversion from VHS to Mp4. Hence, we coded and analyzed the data from 76 cases.

Japanese (I) data. The Japanese (I) study included 45 infants recruited in Sapporo (Kondo-Ikemura et al., 2018). All the infants were 13 months old when participating in the SSP (boys = 46.7%) and were firstborn children in the participating families. The average age of participating mothers was 31.2 years old, ranging between 21 and 42 years when first contacted about this project, and they were all primiparas. All mothers earned a high school degree, and the mean number of years of education was 14.6. The sample of families was considered middle class, with an approximate average annual income of 6,000,000 Japanese yen. In this sample, 33% of the mothers had full-time jobs, and 64% were full-time homemakers. Because one case had no sound in its whole video and another case had no sound in its EP2, the final sample consisted of 44 cases, except for the EP2, in which 43 cases were coded.

Japanese (II) data. The Japanese (II) sample comprised 81 Japanese infants (boys = 46%) recruited from the Hiroshima area (Umemura et al., 2022). Infants' ages ranged from 12 to 18 months (M = 14.64 months). The average age of mothers was 33.68 years old, ranging from 25 to 45 years. The participants were considered middle-class; specifically, the average household income (*very low compared to the average* = 1; *very high compared to the average* = 7) was 4.23 (SD = 1.01), and the average family SES relative to other families in the Japanese society (*very poor* = 1; *very rich* = 10) was 5.66 (SD = 1.24). All mothers completed high school, and 68% earned a bachelor's or master's degree. In this sample, 25% of the infants attended a daycare center, and 31% of the mothers were employed during the study period.

Czech data. The Czech sample consisted of 66 Czech infants (boys = 53%) and their mothers who were recruited from the South Moravian region (Masopustová et al., 2023). Infants' ages ranged from 12 to 17 months (M = 13.8 months). The average age of mothers was 31.9 years old, ranging from 25 to 44 years. Overall, 74% of the mothers earned a

university degree, 23% completed high school, and 3% did not report their education. In this sample, only 3% of the infants attended a nursery school, and only 5% of the mothers were employed during the study period. Regarding our coding, three cases had no sound in their whole videos, one video had no sound in EP2, and another case had no video in EP6, EP7, and EP8. Thus, the final sample comprised 63 cases, except that the EP2, EP6, EP7, and EP8 had 62 cases.

U.S. data. Ainsworth et al.'s (1978) study included 106 infants (boys = 56.6%) from "white, middle-class, Baltimore-area families (p.31)." The participating infants were drawn from four studies (*n* = 23, 33, 23, & 27). The median ages of all the infants were 11.7, 11.3, 11.5, and 12.0 months, ranging from 11.0 to 13.3 months across the four projects.[1] We could not find information about the age and education of mothers in Ainsworth et al.'s (1978) publication.

Procedure

Research assistants coded the crying behaviors of East-Asian and Czech infants and the length of each SSP episode. We obtained information about Ainsworth et al.'s U.S. sample from their book (Ainsworth et al., 1978). The ethical research committee of the Graduate School of Humanities and Social Sciences at Hiroshima University approved this cross-cultural project (the date of approval: December 15, 2022). All the mothers recruited from the East-Asian and Czech studies signed the informed consent form. The data are available at OSF (https://osf.io/zf24j/) to facilitate the replication and reproduction of this study.

Measures

The Strange Situation Procedure (SSP). The SSP (Ainsworth et al., 1978) is a standardized laboratory assessment, which comprises the eight episodes in a fixed order (see Table 1). During the SSP, infants were separated from their mothers twice. The first time,

they stayed with a stranger (Episode 4). The second time, they stayed by themselves (Episode 6), and subsequently, they stayed with a stranger again (Episode 7). After these separations, infants were reunited with their mothers (Episode 5 & Episode 8). When infants were highly distressed, the separation episodes were curtailed. The timing of curtailment was not specified, except that in the Korean study, the duration of separation episodes was at least 30 seconds based on the recommendation of an SSP trainer, Alan Sroufe, who is a well-known scholar on early attachment research.

Crying. Ainsworth et al. (1978) developed a coding system to score the degree to which infants cried during the SSP. The following types of crying were included: hard crying (or screaming), definite crying, fussing, single crying (or isolated and not repeated), crying face without vocalization, and unhappy noise. We excluded "crying face without vocalization" in our coding because we found out that it was difficult to establish a reliable coding result among different coders. Hence, we coded the East-Asian and Czech samples slightly more conservatively compared to Ainsworth et al.'s coding of the U.S. sample; however, this difference was minimal because Ainsworth et al. (1978) reported that this type of crying appeared "relatively infrequently" (p.48), which we also observed in our study. Crying was counted at 15-second intervals. When the separation episodes were curtailed due to the manifestation of undue distress, crying was assumed to continue. The minimum and maximum scores obtained for crying were 0 and 12 points, respectively.

Because Ainsworth et al. (1978) reported their crying scores separately for eight subcategories of attachment patterns (e.g., insecure-avoidant 1, insecure-avoidant 2, etc.), we recalculated the average scores and *SD*s of the total sample based on the information in Table 36 (p. 372) in their book, which presents averages and *SDs* of crying for each episode within subcategories. Figure 11 (p. 245) presents the number of infants in each subcategory. We posted our recalculation sheet on our OSF site.

Reliability. Regarding Ainsworth et al.'s (1978) U.S. data, the authors reported that two observers observed four infants in the SSP, created separate accounts of notes, and coded them separately. Pearson's product-moment coefficient between the two coders was r = .98. In Ainsworth et al.'s (1978) study, two observers always made two dictated accounts and developed the consolidated reports (except for one project with 33 infants coded by one observer). Ainsworth et al. (1978) reported that "when discrepancies between coders arise, they are almost invariably due to carelessness on the part of one coder or the other and are easily corrected by checking back to the protocols themselves" (p. 49).

Regarding East-Asian and Czech projects, two coders who independently watched videos coded 25% of the cases in each project. The following scores indicated the range of inter-coder reliability of crying scores in episodes 2-8: ICC(2, 1) = .784-.997 for Korean data, .766-.996 for Japanese (I) data, .926-.995 for Japanese (II) data, and .730-.984 for Czech data.

Results

Descriptive Statistics

Crying. The means, *SD*s, and ranges of crying across all the projects are presented in Table 2, except for the ranges of Ainsworth et al. (1978), which were not reported. Across all the projects, the levels of crying were the highest during the second separation episodes (Episode 6 & Episode 7), followed by the first separation episode (Episode 4). The levels of crying in the reunion episodes (Episode 5 & Episode 8) were much lower than those in the separation episodes.

INSERT TABLE 2 ABOUT HERE

Duration of the curtailed episodes. The numbers and percentages of curtailed and non-curtailed cases are presented in Table 3. For curtailed cases, we also separately reported cases that were cut short within the first minute, 1 to 2 minutes, and 2 to 3 minutes. Although Ainsworth et al.'s (1978) U.S. study did not provide information on the exact duration of curtailed episodes, they reported the percentage of curtailed cases in Episode 4 and Episode 6 but not Episode 7. The results showed that, compared to the U.S. study, all East-Asian studies had a greater number of curtailed cases. However, East-Asian and Czech studies did not yield the same pattern of results.

INSERT TABLE 3 ABOUT HERE

Cross-Cultural Comparisons of Infant Crying During the SSP

A series of one-way ANOVAs were conducted to compare East-Asian data and Western data for each episode (see Figure 1). For statistically significant ANOVAs, we further reported the results of post-hoc multiple comparison tests (the Tukey HSD). Because we did not have the raw data from Ainsworth et al.'s (1978) U.S. study but only summary data (means, *SD*s, & *n*s), we conducted our statistical analyses using the open-access website where we could run ANOVA with summary data: https://statpages.info (or https://acetabulum.dk). Finally, this same analytical procedure was conducted again only for the infants who were classified as secure (see Figure S1 in the online supplementary material). The results were consistent with those found for the entire sample of infants, as follows.

INSERT FIGURE 1 ABOUT HERE

Episode 2 and Episode 3. For Episode 2, ANOVA indicated no significant difference between infant groups in crying, $F(4, 363) = 1.80$, $p = .129$. However, a significant difference emerged for Episode 3, $F(4, 365) = 3.61$, $p = .007$. When infants met a stranger for the first time, Japanese (I) infants expressed higher levels of crying than Korean infants, $p = .014$, $d = 0.48$, *Diff* = 1.02, 95% CI [0.14, 1.90], Japanese (II) infants, $p = .006$, $d = 0.52$, *Diff* = 1.10, 95% CI [0.23, 1.97], and Czech infants, $p = .005$, $d = 0.41$, *Diff* = 0.92, 95% CI [0.01, 1.84].

Episode 4. The means of crying for Episode 4 were significantly different, $F(4, 365) = 4.42$, $p = .002$. When infants were separated from their mothers for the first time and stayed with a stranger, Japanese (II) infants showed higher levels of crying compared to U.S. infants, $p < .001$, $d = 0.57$, *Diff* = 2.76, 95% CI [0.84, 4.68], and Korean infants, $p = .016$, $d = 0.47$, *Diff* = 2.37, 95% CI [0.29, 4.45].

Episode 5. The means of crying for Episode 5 were not significantly different, $F(4, 365) = 2.03$, $p = .089$, *n.s*. When infants from different countries were reunited with their mothers, their levels of crying did not differ.

Episode 6. Statistically significant differences in crying were observed for Episode 6, $F(4, 364) = 9.05$, $p < .001$. When infants were left alone in a laboratory room, Korean infants showed a significantly higher level of crying compared to U.S. infants, $p < .001$, $d = 0.77$, *Diff* = 3.41, 95% CI [1.57, 5.25]. Japanese (I) and Japanese (II) infants also showed a significantly higher level of crying compared to U.S. infants, $p < .001$, $d = 0.69$, *Diff* = 3.19, 95% CI [1.00, 5.39]and $p < .001$, $d = 0.62$, *Diff* = 2.96, 95% CI [1.16, 4.77], respectively. However, East-Asian infants did not have a significantly higher level of crying compared to Czech infants.

Episode 7. The means of crying were also statistically different for Episode 7, $F(4, 364) = 15.06$, $p < .001$. When infants were separated from their mothers and stayed with a stranger for the second time, Korean infants, Japanese (I) infants, and Japanese (II) infants

showed a higher level of crying compared to U.S. infants, $p < .001$, $d = 0.87$, *Diff* = 4.06, 95% CI [2.09, 6.03]; $p < .001$, $d = 0.84$, *Diff* = 3.94, 95% CI [1.59, 6.29]; and $p < .001$, $d = 0.91$, *Diff* = 4.35, 95% CI [2.41, 6.28], respectively. These East-Asian infants also displayed higher levels of crying compared to Czech infants, $p = .001$, $d = 0.65$, *Diff* = 3.20, 95% CI [0.95, 5.44]; $p = .010$, $d = 0.62$, *Diff* = 3.08, 95% CI [0.49, 5.66]; and $p < .001$, $d = 0.69$, *Diff* = 3.49, 95% CI [1.28, 5.70], respectively.

Episode 8. The means for crying in Episode 8 were significantly different, $F(4, 364) = 4.62$, $p = .001$. When infants were reunited with their mothers for the second time, Japanese (I) infants showed higher levels of crying compared to the Czech infants, $p = .004$, $d = 0.76$, *Diff* = 2.29, 95% CI [0.53, 4.06], and U.S. infants, $p = .002$, $d = 0.73$, *Diff* = 2.22, 95% CI [0.53, 4.06].

Discussion

This study explored whether East-Asian infants would show higher levels of crying compared to Western infants during the SSP. The findings showed that when infants were separated from their mothers for the second time, East-Asian infants cried significantly more compared to Western infants. Specifically, when infants were left alone (Episode 6), all three East-Asian samples scored consistently higher on crying compared to U.S. infants. Subsequently, when infants stayed only with a stranger, all three East-Asian samples consistently displayed higher levels of crying compared to U.S. and Czech infants. Interestingly, during the reunion episodes, infants in the East-Asian studies did not differ in the levels of crying from infants in the U.S. and Czech studies, with the exception of one Japanese sample that scored significantly higher crying compared to the U.S. and Czech samples.

Our Findings Were Consistent with Ainsworth et al.'s Expectations

Bowlby (1969/1982) proposed that infant-caregiver attachment relationships are an outcome of evolution. To increase the chance of survival, infants seek proximity and physical contact during their distress. Proximity and physical contact reduce infants' distress and enhance their emotional security. Therefore, observing the moment of infants' distress provides insight into attachment relationships.

Chronologically speaking, before developing the SSP, Ainsworth (also known by her maiden name Salter) was already able to identify infants who were securely versus insecurely attached to their mothers through naturalistic observations in Uganda. Specifically, Salter (1940) was interested in the hypothesis, originally developed by Blatz, that infants who had developed a feeling of security due to their parents' availability, responsiveness, protection, and reassurance are willing to explore the world learning potentially risky situations. In contrast, those who do not trust their mother's availability and responsiveness stay close to their mother and avoid exploring and learning about new environments due to fear. Ainsworth et al. (1978) explicitly stated that her naturalistic observations at home in the Ganda study supported this hypothesis (Ainsworth, 1963, 1967).

Later, Ainsworth et al. (1978) described that their observations of U.S. infants' attachment behavior at home were unsuccessful. Unlike Ganda infants, most infants in the U.S., regardless of their secure versus insecure patterns of attachment relationships, were eager to explore their home environments confidently from their mothers (Ainsworth et al., 1971; Stayton & Ainsworth, 1973). This experience motivated the researchers to develop the SSP that would increase infants' anxiety, which is necessary to observe their attachment behavior and classify U.S. infants' patterns of attachment relationships.

According to Ainsworth et al. (1978), the SSP was developed to approximate the daily experiences of middle-class U.S. infants but not necessarily of non-U.S. infants. Moreover, they were aware of the possibility that infants in other cultures may show a higher

level of distress, as they stated, “We acknowledge that the strange-situation procedure might not approximate common experiences of infants who are reared differently, whether in other societies or by atypical parents in our own society” (p. xiv). This could explain why East-Asian infants showed higher levels of crying during the SSP compared to U.S. infants, whereas Czech infants did not show significantly different levels of crying from U.S. infants.

The SSP classifications (e.g., “insecure-resistant”) are composed of multiple set of behaviors such as proximity seeking, contact maintenance, distant interaction, the duration of distress, etc. (Ainsworth et al., 1978). These multiple behaviors are all necessary to assess the quality of relationships because behaviors are organized to achieve a particular attachment goal, e.g., feeling secure. However, researchers also need to pay a close attention to a single indicator such as “crying” because a cultural difference of infant behaviors in the SSP may not stem from the quality of relationships but from other factors such as daily experiences.

Our Findings Were Consistent with the Universality of Attachment Relationships Proposed by Bowlby

Interestingly, although East-Asian infants showed higher levels of crying during the separation episodes compared to Western infants, East-Asian and Western infants did not show a different level of crying during the reunion episodes, except that one sample of Japanese infants was more likely to cry at the second reunion episode compared to U.S. and Czech infants. These findings indicate that, regardless of culture, infants feel more secure when they are with their caregivers than when they are separated. This pattern of emotional change between the separation and reunion episodes aligns with the universality hypothesis of attachment theory. As Bowlby (1969/1982) described, an infant is “strongly disposed to seek proximity to and contact with a specific figure and to do so in certain situations, notably when he [or she] is frightened, tired or ill” (p. 371; the bracket was added by the authors). After being reunited with the mother, infants feel less distressed.

Limitations and Future Studies

This study found that when infants meet a stranger for the first time (Episode 3), one sample of Japanese infants (I) showed a higher level of crying compared to Czech, Korean, and the second sample of Japanese infants (II). During the first separation episode (Episode 4), one sample of Japanese infants (II) showed a higher level of crying than U.S. and Korean infants, and during the second reunion episode (Episode 8), one sample of Japanese infants (I) showed a higher level of crying than Czech and the U.S. infants. These results were inconsistent across three East-Asian samples and, therefore, not robust. More studies are needed to establish cultural differences in these episodes. Nonetheless, all of these findings indicated significantly higher crying scores of Eastern infants compared to those of Western infants, supporting the robustness of this study.

When infants were alone during the separation episode (Episode 6), Czech infants' crying was not statistically different from East-Asian infants' crying. One reason for this non-significant result in Episode 6 could be that the majority of infants in this Czech sample (97%) did not regularly go to a daycare center, and the majority of the mothers (95%) stayed at home during the study period (Masopustova et al., 2023). However, when a stranger entered the room (Episode 7), Czech infants cried *less* compared to East-Asian infants. On the other hand, we found no significant differences between Czech and U.S. infants, suggesting that Czech and U.S. infants' crying levels were comparable but differed from those of East-Asian infants.

The U.S. data were collected much earlier than the other data in this study. One reason for using this particular set of the U.S. data is that Ainsworth et al.'s (1978) study is the original validation study of the SSP and is still currently used to follow the procedure and coding as the gold standard. However, future studies should replicate the results of this study.

Finally, this study focused specifically on East-Asian infants; hence, future studies need to collect more diverse SSP samples cross-culturally. We collected East-Asian regional data to ensure that our research questions would yield meaningful results before collecting, coding, and analyzing more diverse cross-cultural data, which would require more time and resources. In addition, because Korean and Japanese cultures are not identical and we found differences in East-Asian infants' crying, exploring differences between Korean and Japanese attachment behaviors will be important in future studies.

Conclusions

This study contributed to the literature on infant attachment, reporting statistically significant cross-cultural differences in infant crying behavior during the SSP. When infants were separated from their mothers during the second separation (alone and subsequently with a stranger), East-Asian infants were more likely to show higher levels of crying compared to Western infants. These results were consistent across three East-Asian samples from Korea and Japan. Despite these higher levels of crying during the separation episodes, East-Asian infants did not show different levels of crying in the reunion episodes compared to Western infants, except for the first sample of Japanese infants that showed higher levels of crying compared to Western infants. These results were consistent with Bowlby's (1969/1982) theory of attachment relationships viewed as an outcome of evolution and Ainsworth et al.'s (1978) claims of cultural differences.

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Footnotes

[1]Ainsworth et al. (1978) reported ages in weeks, and we multiplied the numbers by 0.23 to convert them into months.

Table 1

The Details of the Strange Situation Procedure

Episode	Persons present in a laboratory room			Duration
1	infant	mother	observer	1 minute or less
2	infant	mother		3 minutes
3	infant	mother	stranger	3 minutes
4	infant		stranger	3 minutes or *curtailed if the infant is unduly distressed*
5	infant	mother		3 minutes
6	infant			3 minutes or *curtailed if the infant is unduly distressed*
7	infant		stranger	3 minutes or *curtailed if the infant is unduly distressed*
8	infant	mother		3 minutes

Table 2

Means, SDs, and Ranges of Crying During the Strange Situation Procedure

	Korean Data (n = 76)			Japanese (I) Data (n = 44)			Japanese (II) Data (n = 81)			Czech Data (n = 63)			U.S. Data (n = 106)	
	M	(*SD*)	Range	*M*	(*SD*)	Range	*M*	(*SD*)	Range	*M*	(*SD*)	Range	*M*	(*SD*)
EP2 (I, M)	0.04	(0.20)	0-1	0.28	(0.96)	0-6	0.19	(0.57)	0-4	0.15	(0.51)	0-3	0.41	(1.59)
EP3 (I, M, S)	0.41	(1.17)	0-6	1.43	(2.77)	0-12	0.33	(1.15)	0-9	0.51	(1.60)	0-11	0.75	(1.84)
EP4 (I, S)	3.58	(4.74)	0-12	4.64	(4.72)	0-12	5.95	(5.39)	0-12	3.90	(4.79)	0-12	3.19	(4.20)
EP5 (I, M)	1.18	(2.27)	0-12	2.20	(2.22)	0-8	2.12	(2.53)	0-12	1.63	(2.48)	0-11	2.10	(3.02)
EP6 (I)	10.14	(3.43)	0-12	9.93	(3.89)	0-12	9.70	(4.29)	0-12	8.34	(4.75)	0-12	6.74	(5.24)
EP7 (I, S)	9.28	(4.28)	0-12	9.16	(4.32)	0-12	9.57	(4.57)	0-12	6.08	(5.48)	0-12	5.22	(5.02)
EP8 (I, M)	3.59	(3.72)	0-12	5.02	(3.03)	0-12	3.78	(3.31)	0-12	2.73	(3.05)	0-12	2.80	(3.08)

Notes. EP = Episode. I = infant. M = mother. S = stranger. Ainsworth et al.'s U.S. data did not provide information on the range of crying scores.

Table 3

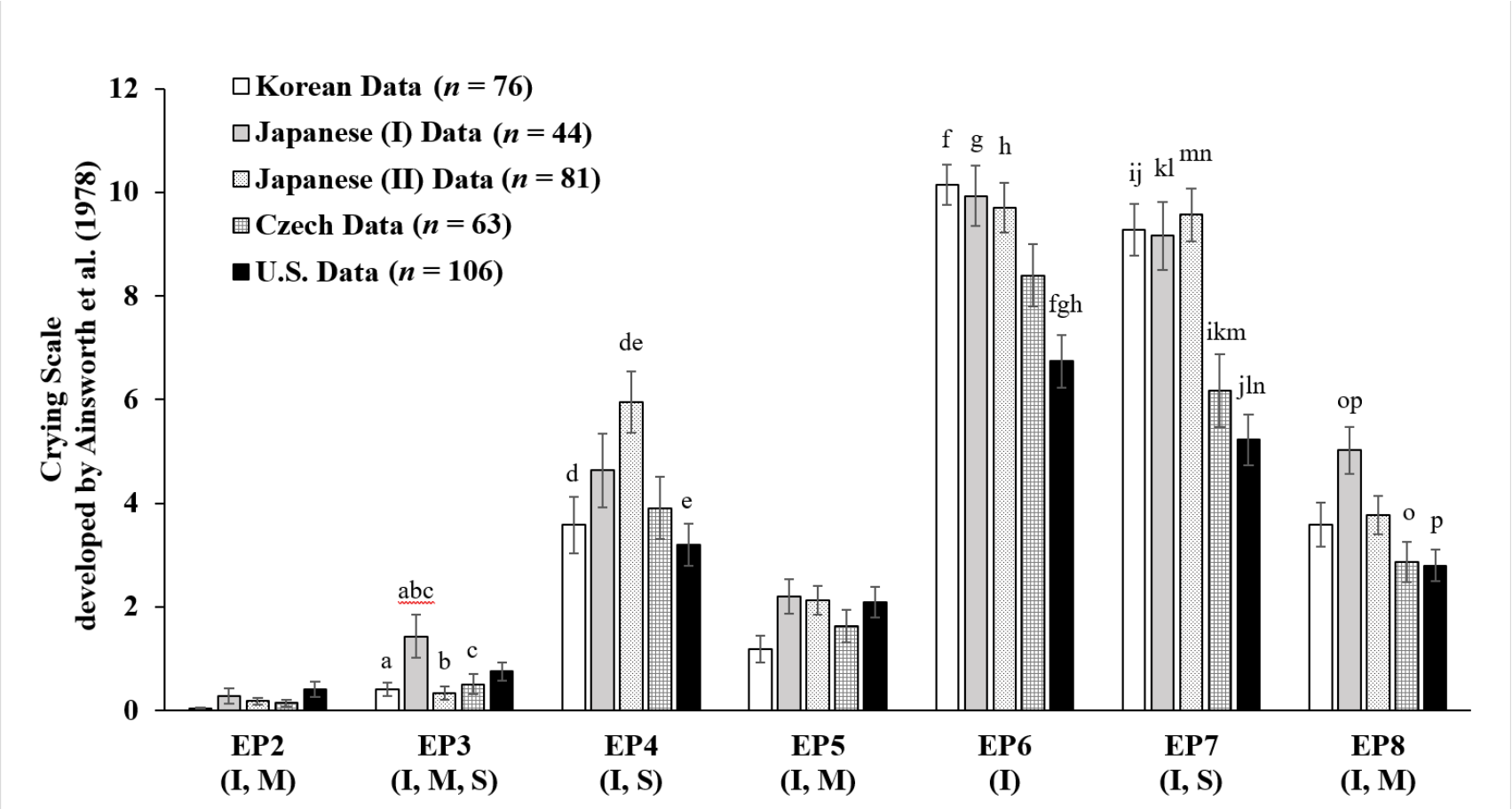
Duration of Separation Episodes During the Strange Situation Procedure

	Korean Data (n = 76)				Japanese (I) Data (n = 44)				Japanese (II) Data (n = 81)				Czech Data (n = 63)				U.S. Data (n = 106)	
	Curtailed			3 min	Curtailed			3 min	Curtailed			3 min	Curtailed			3 min	Curtailed	3 min
	0-1min	1-2min	2-3min		0-1min	1-2min	2-3min		0-1min	1-2min	2-3min		0-1min	1-2min	2-3min			
EP4	2 (3%)	12 (16%)	1 (1%)	61 (80%)	6 (13%)	2 (4%)	4 (9%)	33 (73%)	29 (36%)	7 (9%)	3 (4%)	42 (52%)	4 (6%)	7 (11%)	14 (22%)	38 (60%)	19%	81%
EP6	30 (39%)	21 (28%)	7 (9%)	18 (24%)	27 (60%)	4 (9%)	2 (4%)	12 (27%)	60 (74%)	1 (1%)	1 (1%)	19 (23%)	28 (44%)	10 (16%)	14 (22%)	11 (18%)	53%	47%
EP7	23 (30%)	22 (29%)	7 (9%)	24 (32%)	22 (50%)	7 (16%)	0 (0%)	15 (34%)	55 (68%)	7 (9%)	0 (0%)	19 (23%)	20 (32%)	8 (13%)	10 (16%)	25 (40%)	N/A	N/A

Notes. EP = Episode. I = infant. M = mother. S = stranger.

Figure 1

East-Asian and Western Infants' Levels of Crying During the Strange Situation Procedure



Notes. I = infant. M = mother. S = stranger. EP = Episode. Error bars indicate standardized errors. The same lowercase letters above bars represent statistically significant difference