

## French Version of the Brief Infant-Toddler Social and Emotional Assessment Questionnaire–BITSEA

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**Objective** The aim of the present study was to examine the psychometric properties of the French version of the Brief Infant-Toddler Social and Emotional Assessment (BITSEA). **Methods** The sample consisted of 589 low-risk infants aged 12–36 months and their parents. Parents completed the BITSEA, the Child Behavior Checklist 1½–5 (CBCL – 18 months to 5 years version), and the Parenting Stress Index – Short Form (PSI-SF). **Results** Multitrait-multimethod and confirmatory factor analyses revealed adequate psychometric properties for the French version of the BITSEA. Scores on the BITSEA Problem scale were positively correlated to all CBCL and PSI-SF subscales, whereas negative correlations were found between BITSEA Competence scale and CBCL and PSI-SF subscales. The BITSEA Problem score significantly increased with level of parental worry, examined through a single-item question that is part of the BITSEA. **Conclusion** Findings support the validity of the French version of the BITSEA. However, additional work on the clinical validity of the BITSEA, including with at-risk children, is warranted.

**Key words** infant; parent; screening; social–emotional development; toddler; validity.

### Introduction

Early screening of social and emotional difficulties or developmental delays during infancy and early childhood is of undeniable interest for prevention and intervention in mental health. Epidemiological studies show a high prevalence of these difficulties, ranging from 7% up to 24%, in infants aged 1–3 years (Briggs-Gowan, Carter, Moya Skuban, & Horwitz, 2001; Egger & Angold, 2006; Horwitz, Gary, Briggs-Gowan, & Carter, 2003). There are well-documented links between early social and emotional problems (social withdrawal, aggressive behavior) or delays

in competences (prosocial interaction with peers, attention skills, imitation) and problematic achievement of developmental milestones, school problems, and later psychopathology (Briggs-Gowan & Carter, 2008; Irwin, Carter, & Briggs-Gowan, 2002; Pihlakoski et al., 2006). Such evidence brings support to an earlier detection of the child's difficulties and to the implementation of timely and well-targeted interventions.

However, although most of young children are regularly examined by a pediatrician during routine visits, and even if this setting is recommended as a suitable context of screening for social–emotional difficulties and

developmental delays (American Academy of Pediatrics, 2001), health-care professionals are often poorly equipped and not skilled enough to explore these issues with the families. Hamilton (2006) regrets that, in the United States, fewer than 10% of children receive a pediatric well-child checkup using a standardized screening tool for developmental delays, and that fewer than 50% of parents spontaneously mention the development of their infant with their doctor (National Center for Health Statistics (U.S.), 2002). This significantly reduces the chances that an early developmental disorder will be treated before the age of 5 (Hamilton, 2006). The use of short comprehensive questionnaires such as screeners may help parents talk about their child's difficulties, promote the dialogue between parents and pediatrician, and facilitate the child's referral if needed (Squires, Bricker, Heo, & Twombly, 2001). Pediatricians are actually one of the most important bridges between families and mental health services for children (Forrest et al., 1999). In addition, most of screening questionnaires do not require much training for being used and analyzed. They can therefore be easily applied in primary health-care clinics and daycare centers.

Only a few tools have been designed for infants and for early and widespread screening. Available tools such as the Child Behavior Checklist 1½–5 (CBCL – 18 months to 5 years version) (Achenbach & Rescorla, 2000; Ivanova et al., 2010) and the ITSEA (Infant Toddler Social–Emotional Assessment; Bracha et al., 2004; Carter & Briggs-Gowan, 2000) are too lengthy (100 and 169 items, respectively), and therefore not suitable for rapid and widespread screening. Others instruments are confined to a single symptom domain (e.g., M-Chat, designed for the early detection of autistic symptoms) (Robins, Fein, Barton, & Green, 2001), and do not provide adequate coverage of the range of social–emotional symptoms observed in infancy and toddlerhood (i.e., sleep disorders, oppositional behavior, etc). The BITSEA (Brief Infant-Toddler Social and Emotional Assessment) is a shorter version of the ITSEA (Briggs-Gowan & Carter, 2006). It is a first-stage brief screening tool for identifying infants and toddlers aged 1–3 years who, according to parents' or child-care providers' report, exhibit elevated levels of social–emotional problematic behaviors or low/delayed levels of competence.

A growing number of studies have examined the validity and the reliability of the BITSEA in different samples and countries ( $N = 38$ – $50$  low-risk infants, Northern Finland, Haapsamo et al., 2012;  $N = 462$  infants, community sample, Turkey, Karabekiroglu et al., 2009;  $N = 112$  infants, clinical sample, Turkey, Karabekiroglu, Briggs-Gowan, Carter, Rodopman-Arman, & Akbas, 2010;  $N = 3170$  infants, community sample, The Netherlands,

Kruizinga et al., 2012). The samples consisted of toddlers aged from 12 to 42 months (mean age: 24.6 months, Karabekiroglu et al., 2009; 29.8 months, Karabekiroglu et al., 2010; 23.7 months, Kruizinga et al., 2012) and from 18 to 36 months (Haapsamo et al., 2012). In all but one study (Karabekiroglu et al., 2010), parents were recruited in health-care centers during routine visits. The internal consistency of the BITSEA Problem scale was found to be acceptable to excellent across these studies (from 0.60 to 0.83), whereas these values have been regularly found to be slightly lower for the BITSEA Competence scale (from 0.57 to 0.72). In two different studies, Karabekiroglu et al. have found a good inter-rater reliability for the BITSEA Problem scale ( $\rho = 0.68$ , Karabekiroglu et al., 2009;  $\rho = 0.66$ , Karabekiroglu et al., 2010) and the BITSEA Competence scale (respectively,  $\rho = 0.71$  and  $\rho = 0.63$ ). In contrast, Kruizinga et al. (2012) reported low inter-rater reliability (BITSEA Problem,  $\rho = 0.30$ ; BITSEA Competence,  $\rho = 0.17$ ). To date, all studies with the BITSEA have examined concurrent validity with regard to one of the preschool versions of the CBCL. BITSEA Problem scores have been found to be moderately to highly correlated to CBCL Total, Externalizing, and Internalizing scores (correlations going from 0.46 to 0.79). Two studies have tested the clinical validity of the BITSEA, but only one outside the United States. In an outpatient psychiatric clinic in Turkey, Karabekiroglu et al. (2010) found that BITSEA Competence scores were significantly lower for children diagnosed with autism compared with children with no diagnosis, with disruptive behavior disorder, or with anxiety/depression. More recently, in the United States, Briggs-Gowan et al. (2013) evaluated the clinical validity of the BITSEA relative to a diagnostic interview, as well as to the CBCL 1½–5. Results showed that the BITSEA Problem scale has satisfactory sensitivity and specificity relative to children's diagnosis (respectively, 72.7–80.8% and 70.0–83.3%) and to clinical-range CBCL scores (respectively, 80.0–96.2% and 75.0–89.9%).

In the present study, we sought to examine the psychometric properties of the French version of the BITSEA in a population of parents of low-risk infants and toddlers aged 12–36 months met in public well-baby and health clinics and daycare centers. Its applicability and screening qualities for the detection of early social–emotional difficulties and development problems were compared with those of other available tools, namely, the CBCL 1½–5 (Achenbach & Rescorla, 2000) and the Parenting Stress Index – Short Form (PSI-SF; Abidin, 1995). It is important to note that, to our knowledge, there is only one study in France that has used the PSI-SF and the CBCL 1½–5 with parents of children of the same age range as ours, but

results on these specific measures have not yet been published (Tubach et al., 2012). Because the CBCL provides assessment of child externalizing and internalizing problems, it was hypothesized that CBCL subscales will be positively correlated to the BITSEA Problem scale and negatively correlated to the BITSEA Competence scale. CBCL was used as a measure of concurrent validity of the BITSEA. On the other hand, child behavior difficulties have been linked to parenting stress (Hassall, Rose, & McDonald, 2005; Quine & Pahl, 1991). The three PSI-SF subscales are expected to be positively correlated to the BITSEA Problem scale and the CBCL subscales and negatively correlated to the BITSEA Competence scale.

## Method

### Participants and Procedure

Participation in the study was proposed to 770 parents. Parents were enrolled by eight trained psychologists in public child health services (DEPSE – Department of Child Health Periodic Checkups) and well-baby clinics ( $n = 424$ ), as well as in daycare centers ( $n = 165$ ). The only noninclusion criterion was the parents' insufficient fluency in French. Parents were given written information on these questionnaires and were free to object to participation. Only anonymous data were used. Questionnaires were filled in by only one parent per child (130 fathers and 459 mothers; mean age = 33.05 years,  $SD = 5.34$ ) of 589 infants aged 12 up to 36 months (mean age = 19.05 months,  $SD = 6.95$ ). Parents having more than one child in the eligible age range were asked to complete one set of questionnaires per child. Reasons for not participating in the study include lack of time ( $n = 74$ ), length of the set of questionnaires ( $n = 65$ ), and not being interested in the study ( $n = 42$ ). Infants were 320 boys and 269 girls, 566 of them living in Paris and its surroundings, and the remaining 23 in the city of Brest. Most infants ( $n = 544$ ) attended daycare centers or had other care arrangements outside the family (mean hours spent outside the family per week = 26.24 hr;  $SD = 10.4$ ). Almost 10% of children ( $n = 57$ ) were born prematurely (mean number of days of prematurity at birth, i.e., before 37 weeks of gestation = 34.51 days,  $SD = 19.58$ ). Infant's mean weight and length at birth were 3.2859 ( $SD = 512.06$ ) g and 52.03 ( $SD = 33.82$ ) cm, respectively.

The research psychologists presented the protocol to parents and collected written consent for participation in the study. They remained available to parents for any questions concerning the study and the set of questionnaires. In the DEPSE and the well-baby clinics, parents filled up the questionnaires on site, before or after the medical

examination of their child. In the daycare centers, parents completed questionnaires at home and returned them in a sealed envelope to the daycare center. The study protocol and consent procedures have been approved by the CEERB Paris Nord Ethics Committee (January 2010). The study has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

## Measures

### Brief Infant-Toddler Social and Emotional Assessment

The BITSEA (Briggs-Gowan & Carter, 2007) is a 42-item questionnaire. It is designed as a screening tool for identifying social-emotional and behavioral problems and/or delays or deficits in children aged between 12 and 36 months. The questionnaire can be completed by parents or by childcare providers, and may also be used as a structured interview. In the present study, the BITSEA was used as a parent-administered questionnaire. The BITSEA covers (1) externalizing problems (6 items), (2) internalizing problems (8 items), (3) social-emotional competences (11 items), (4) dysregulation problems (8 items), (5) potential early signs of autism spectrum disorders (17 items), and (6) 14 questions considered as red flag items (clinically significant problems such as *does not react when hurt, hurts self on purpose*). The BITSEA items compose two scales: Problems (31 items) and Competences (11 items). The response format for each item includes three options: "not true/rarely" (0), "sometimes true/sometimes" (1), and "very true/often" (2). Responses are summed for each scale. A high score on the Problem scale or a low score on the Competence scale indicates less favorable development. BITSEA screening cutoff points are designed to broadly capture children with potential problems that deserve additional follow-up and/or assessment. The Problem cutoff point is designed to identify children with scores at or above the 75th percentile in the normative birth cohort. The Competence cutoff point is designed to identify children with scores in the lowest 10<sup>th</sup>–15<sup>th</sup> percentile relative to the birth cohort. These cutoff points have demonstrated very good sensitivity and specificity relative to other measures of child problems, such as the CBCL (Briggs-Gowan et al., 2004). In addition to the 42 items, the BITSEA includes two single-item questions on parental worries regarding child behavior, emotions or relationships (BITSEA-A item) and child language development (BITSEA-B item). Parents' answers to BITSEA-A item were used as a measure of parental worry to test, to some extent, the discriminative validity of the BITSEA (see *Data Analyses* section). Translation into French has followed international guidelines (Wild et al., 2005).

### Child Behavior Check List 1½–5

The CBCL 1½–5 (18 months to 5 years; Achenbach & Rescorla, 2000) is part of the Achenbach System of Empirically Based Assessment (Achenbach & Rescorla, 2000) and is currently the most widely used preschooler screening tool for social–emotional and behavioral symptoms (Ivanova et al., 2010; Rescorla, 2005). Although a recent validation study on the CBCL 1½–5 conducted in 23 societies (including the French-translated version used in the present study) has confirmed its transcultural validity (Ivanova et al., 2010), there are no available normative data on this tool for the French population. Normative data from the original validation study for nonreferred children are given in Table III for CBCL subscales. The questionnaire may be completed by parents and by childcare providers. It comprises 100 items that are rated on a Likert-type scale ranging from “not true” (0) to “somewhat or sometimes true” (1) to “very true or often true” (2). The sum of all items forms the Total problem scale score. Items cover both externalizing and internalizing problems and may be divided into seven subscales: aggressive behavior, anxious/depressed, attention problems, emotionally reactive, somatic complaints, withdrawal, and sleep problems.

### Parenting Stress Index Short-Form

The PSI-SF (Abidin, 1995) is a shorter version of the Parenting Stress Index (PSI; Abidin, 1983). The PSI is a self-report questionnaire composed of 120, 5-point Likert scale items covering parental and child dimensions related to parenting stress (Reitman, Currier, & Stickle, 2002). As previously noticed for the CBCL 1½–5, although the PSI-SF has been widely used and validated in many countries, this tool has not yet been validated for the French population. In the present study, the short form derived from the French Canadian PSI validated version was used (Bigras, La Frenière, & Dumas, 1996). Normative data from the original validation study are given in Table III. Parenting stress is a complex construct that involves a combination of child and parent characteristics, as well as family situational components related to a person’s appraisal of his or her role as a parent (Everly & Lating, 2004). The shorter version used in the present study (PSI-SF; Abidin, 1995) consists of 36 items divided into three 12-item empirically derived scales: Parental Distress (PD), Parent–Child Dysfunctional Interaction (PCDI), and Difficult Child (DF). Lower scores indicate less stress. The DF domain of the PSI-SF taps whether a child is easy versus difficult to manage, and has been linked to behavior problems in 2-year-olds (Briggs-Gowan & Carter, 2007). Irwin et al. (2002) found that mothers of “late-talking” toddlers (21–31 months) scored significantly higher on

the PCDI scale as compared with mothers of control toddlers, supporting the hypothesis that mothers of “late talkers” would experience more parenting stress than mothers of typical toddlers.

### Sociodemographic data

Questions on standard socio-demographic variables provided information on child’s age and gender, gestational age at birth, use of daycare center facilities, and parents’ gender and age. However, we were not allowed to get data on the parents’ education level and professional status, or on their ethnic origin, income, housing conditions, and family structure, which precluded the study of the impact of these parental and family factors on parental ratings of child characteristics. Likewise, we are not able to establish the utility of the BITSEA with a range of respondent demographics such as low literacy, low education families, unemployed families, and immigrant families.

### Data Analyses

Analyses were performed with R Statistical Software (version 2.12.2). All tests were two-tailed, and alpha level of 5% was considered as statistically significant. From the whole sample, 396 parents (67.23%) completed all items of the BITSEA. A comparative analysis on missing data between the two different settings (public health/well-baby clinics and daycare centers) revealed that BITSEA questionnaires with at least one missing item were more frequent for parents met in public health/well-baby clinics (162 of 427) than in daycare settings (31 of 162; Fisher exact test, odds ratio = 2.57,  $p < .000$ ).

To limit bias linked to estimations of missing data, only questionnaires containing one ( $n = 82$ ) or two ( $n = 49$ ) missing items have been completed by a replacement procedure called the nearest neighbor hot-deck imputation, which means that missing values have been replaced by those of the participant having the nearest answers’ characteristics (relatively to his/her answers to other items). This resulted in 527 completed BITSEA questionnaires for both dimensions. Slight differences in sample size in some analyses are owing to missing values in only one BITSEA dimension or in a single item. Missing data in the CBCL 1½–5 and the PSI-SF have not been replaced, and only fully completed questionnaires have been taken into account for data computations.

Convergent and discriminant validity of the BITSEA’s two dimensions were computed by a multitrait-multimethod approach. This method consists in calculating for each item its correlation to the global score found for each dimension (Problem or Competence). This means that each item is expected to be highly and positively

correlated to its dimension of origin, and conversely, to show low to null correlations with the other dimension. As a complement, confirmatory factor analyses (CFAs) were also been performed to examine construct validity. CFA is a measurement model that specifies the relationship of the observed measures to their hypothesized underlying constructs. CFA was conducted with the R package “lavaan” (version 2.12.2), and using the maximum likelihood with robust standard errors. Several standard fit indices that assess how well the proposed model fits the sample data have been generated, including the comparative fit index (CFI) and the standardized root mean square residual (SRMR). Values greater than 0.9 for the first index and less than 0.08 for the second are deemed acceptable. The root mean square error of approximation (RMSEA) is another fit index that takes into account the error of approximation in the population (Byrne, 1998). RMSEA values less than .05 indicate a good model fit.

Cronbach’s alpha was computed to evaluate the internal consistency of the BITSEA’s Problem and Competence scales. Concurrent validity was hypothesized to be expressed in large and positive Pearson correlations between the BITSEA Problem scale and the main CBCL 1½–5 subscales (Internalizing, Externalizing, Total), as well as with PSI-SF scales (PD, PCDI, DF, Total). Conversely, small to medium negative correlations were expected to be found between the BITSEA Competence scale and the CBCL 1½–5 and PSI-SF subscales. A correlation of 0.1 is considered small, 0.3 is considered medium, and >0.5 is considered as large (Cohen, 1988). To test, to some extent, the discriminative validity of the BITSEA, namely, the ability of the BITSEA to distinguish between parents who reported having worries about their child’s behavior, emotions, or relationships and parents who were not worried, correlations between parental worries and BITSEA Competence and Problem scores were computed. Parental worries were examined through a single-item question that is part of the BITSEA, but does not add to either BITSEA scale score (BITSEA-A item). This question was therefore considered as suitable to assess discriminative validity, as recently mentioned by Kruizinga et al. (2012). By answering this question, the parent was invited to say how much she/he worried about the child’s behaviors, emotions, or relationships, on a four-level basis: 1 – not worried at all; 2 – a little worried; 3 – worried; 4 – very worried. Polyserial correlations (Olsson, Drasgow, & Dorans, 1982) between BITSEA Problem/Competence scores and levels of parental worry were computed. To assess parental appraisal of the usefulness and the easiness of rating of the BITSEA, after they completed the scale, parents were asked to express their judgment by tracing

a cross on two 10-cm lines. Each line ranges from 0 (not useful/difficult to rate) to 10 (very useful/very easy to rate).

## Results

### Data Description

Table I presents the mean scores for the BITSEA’s items and Problem and Competence scales. Interestingly, items of the Competence scale had the highest mean scores (all are higher than one), showing that most parents had a positive appraisal of their infant’s capabilities. Inversely, the lowest mean scores (near to zero) were found for items related to the child’s negative emotions or withdrawal behavior (*Has less fun than other children; Seems very unhappy, sad, depressed, or withdrawn*), or to early signs of pervasive developmental disorders (*Repeats the same action or phrase over and over without enjoyment; Avoids physical contact*).

Table II presents the distribution of scores taking into account the original cutoff scores by children’s age and gender. On the whole, 15–20% of children were identified as having social–emotional problems or delays relative to the normative cutoff points of the original sample. These values are in line with prevalence rates found in epidemiological studies on social and emotional difficulties in infants aged 1–3 years (7–24%; Briggs-Gowan et al., 2001; Egger & Angold, 2006; Horwitz et al., 2003). It should be noticed, however, that our sample has a higher proportion of young infants (12–17 months) than other studies with the BITSEA.

As for CBCL 1½–5 subscales, our sample has lower scores than the normative mean scores in all scales. Scores on the PSI-SF were also lower than normative data for this tool (Table III). One explanation for lower scores may be the rate of missing data. Missing data on one item preclude the computation of a final score in the related subscale. If a number of parents whose children show problematic behavior do not answer to items related to these symptoms, final scores will be subject to bias. However, taken together, these results tend to confirm the low-risk status of the study population.

### Convergent and Discriminant Validity

Analyses performed with a multitrait-multimethod approach revealed that the BITSEA has a global satisfactory factor structure (Table IV). With the exception of two items (Item 10, *Looks for you (or other parent) when upset*, loading on the Competence scale, and item 14, *Does not react when hurt*, loading on the Problem scale), all items were positively correlated to their dimension of origin, whereas correlations to the opposite dimension were low to null.

Table I. Mean Scores for BITSEA's Items, Problem and Competence Scales, Easiness and Usefulness Ratings

Items	N	Mean	SD	Items	N	Mean	SD	Items	N	Mean	SD
BITSEA.1	581	1.79	0.45	BITSEA.17	577	0.42	0.66	BITSEA.33	576	0.21	0.46
BITSEA.2	583	0.31	0.51	BITSEA.18	560	0.47	0.70	BITSEA.34	576	0.20	0.48
BITSEA.3	579	0.33	0.54	BITSEA.19	550	1.75	0.49	BITSEA.35	571	0.25	0.51
BITSEA.4	584	0.89	0.74	BITSEA.20	577	1.14	0.69	BITSEA.36	563	0.07	0.33
BITSEA.5	575	1.27	0.59	BITSEA.21	580	0.48	0.65	BITSEA.37	568	0.19	0.51
BITSEA.6	586	0.62	0.75	BITSEA.22	541	1.07	0.78	BITSEA.38	571	0.14	0.39
BITSEA.7	582	0.28	0.53	BITSEA.23	581	0.39	0.58	BITSEA.39	574	0.15	0.43
BITSEA.8	567	0.47	0.64	BITSEA.24	579	0.13	0.36	BITSEA.40	573	0.04	0.20
BITSEA.9	580	0.06	0.27	BITSEA.25	573	1.36	0.75	BITSEA.41	572	0.19	0.46
BITSEA.10	575	1.36	0.68	BITSEA.26	584	0.41	0.57	BITSEA.42	572	0.46	0.64
BITSEA.11	583	0.91	0.72	BITSEA.27	534	0.28	0.52	BITSEEA.A	586	1.43	0.80
BITSEA.12	561	0.15	0.39	BITSEA.28	581	0.24	0.50	BITSEEA.B	581	1.40	0.77
BITSEA.13	581	1.70	0.56	BITSEA.29	581	1.59	0.67	BITSEA_Problem	528	9.39	5.47
BITSEA.14	571	0.33	0.59	BITSEA.30	578	0.35	0.58	BITSEA_Competence	542	16.25	3.20
BITSEA.15	576	1.79	0.49	BITSEA.31	581	1.37	0.76	Usefulness	458	6.94	2.87
BITSEA.16	572	0.28	0.52	BITSEA.32	574	0.04	0.21	Easiness	455	7.54	2.47

Note. BITSEA A = parental worries about child's behavior, emotions, or relationships; BITSEA B = parental worries about child's language development; Usefulness and Easiness = parental ratings on the usefulness and the easiness of the BITSEA on a 10-cm line.

### Construct Validity

As a complement to multitrait-multimethod approach, CFAs were also performed (Table V). Factor structure of the two BITSEA scales was found to be adequate. Each item is well associated to its corresponding original scale, with the exception of Item 10 ( $p > .10$ ). Two model fit indexes are adequate: SRMR (= 0.06;  $N = 527$ ) and RMSEA (= 0.04). The CFI (= 0.59) did not reach acceptable level, but this is not surprising, given that CFI is sensitive to correlation levels between items and that correlations between BITSEA items are low, as expected.

### Concurrent Validity

Pearson correlations were computed between the BITSEA Problem scores, the three main CBCL subscales, and the four subscores of the PSI-SF (Table VI). Correlations between the BITSEA Problem scale and CBCL subscales were found to be positive and highly significant. However, correlations are not as large as found for the original sample. This may be owing to some specific characteristics of our sample, such as the fact that most children are in the youngest age range or that parents were partially recruited in daycare centers, whereas in other studies, parents were met in primary health-care centers.

Inversely, correlations between scores on the BITSEA Competence scale and CBCL subscales were all very small, close to nil, and mostly negative. BITSEA Problem scores were also positively and significantly correlated to all PSI-SF scales, whereas BITSEA Competence scores were

negatively correlated to parental stress, as measured by the four PSI-SF scales.

In addition, Table VI also shows that the three CBCL subscores were positively correlated to the PSI-DF scale, whereas CBCL Internalizing and Total scales were only poorly correlated to PSI-PD and PSI-Total scores. However, scores on PCIDI scale were not correlated to any of the CBCL subscales.

### Internal Consistency of the BITSEA's Problem and Competence Scales

Internal consistency for the BITSEA's Problem and Competence scales was found to be adequate (respectively, Cronbach's  $\alpha = .79$  and  $\alpha = .65$ ), and very similar to those found in other studies (respectively,  $\alpha = .76$  and  $\alpha = .63$ , Kruizinga et al., 2012;  $\alpha = .81$  and  $\alpha = .72$ , Karabekiroglu et al., 2009).

### Effect of Parents' Gender and Age on BITSEA Ratings

Analyses showed no significant effect of the parents' gender on their ratings of BITSEA's Problem scale (fathers' mean score/ $SD = 9.8 \pm 5.3$ ; mothers' mean score/ $SD = 9.3 \pm 5.5$ ; Student's  $t = .9$ ,  $p \leq .32$ ). However, there was a trend for mothers to give a higher score than fathers to their infant on the BITSEA Competence scale (fathers' mean score/ $SD = 15.8 \pm 2.9$ ; mothers' mean score/ $SD = 16.4 \pm 3.3$ ; Student's  $t = -1.72$ ,  $p \leq .08$ ). With regard to parents' age, no significant impact on their ratings on BITSEA Competence or Problem scales was found,

Table II. Distribution of BITSEA Scores Relative to Normative Cutoff Points for Children's Age Range and Gender

BITSEA scales/Children's age ranges		Girls (N = 258)		Boys (N = 307)	
BITSEA Problem					
Age range	Total	Possible problem		Total	Possible problem
12/17 months	169	33 (19.50%)		215	49 (22%)
18/23 months	33	8 (24%)		34	2 (5%)
24/29 months	29	2 (6%)		25	2 (8%)
30/35 months	27	9 (33%)		33	8 (24%)
Total by gender		52 (20.10%)			61 (19.80%)
Total possible problem					
113 (20%)					
BITSEA Competence					
Age range	Total	Possible delay		Total	Possible delay
12/17 months	169	31 (18.30%)		215	28 (13%)
18/23 months	33	6 (18%)		34	9 (26.40%)
24/29 months	29	1 (3%)		25	2 (8%)
30/35 months	27	4 (14.80%)		33	4 (12%)
Total by gender		42 (16.20%)			43 (14%)
Total possible delay					
85 (15%)					

Table III. Mean Scores for CBCL 1½–5 and PSI-SF Subscales and Normative Data

Scores	Sample			Normative data		T value	95% CI
	N	Mean	SD	Mean	SD		
PSI_Parental Distress	531	27.34	9.84	26.40	7.20	2.21*	26.50–28.18
PSI_Dysfunctional Interaction	499	22.24	10.18	18.70	4.80	7.77***	21.35–23.14
PSI_Difficult Child	505	25.23	9.66	26.00	6.70	-1.79	24.39–26.08
PSI_Total	441	74.62	26.69	71.96	15.40	2.09*	72.12–77.12
CBCL Internalizing	419	4.47	4.66	8.7	6.3	-18.62***	4.02–4.91
CBCL Externalizing	441	9.32	6.56	13.1	7.8	-12.08***	8.71–9.94
CBCL Total	339	21.62	16.12	33.4	18.8	-13.46***	19.89–23.34
CBCL Emotionally Reactive	468	1.66	1.86	2.4	2.2	-8.64***	1.49–1.83
CBCL Anxious/Depressed	460	1.18	1.51	3.0	2.3	-25.75***	1.05–1.32
CBCL Somatic Complaints	456	0.99	1.41	1.9	1.9	-13.75***	0.86–1.12
CBCL Withdrawal	465	0.82	1.38	1.7	1.7	-13.80***	0.69–0.94
CBCL Sleep Problems	475	2.32	2.40	2.9	2.4	-5.30***	2.10–2.53
CBCL Attention Problems	474	2.30	1.75	2.6	1.9	-3.74***	2.14–2.56
CBCL Aggressive Behavior	450	7.04	5.41	10.5	6.4	-13.56***	6.54–7.55

Note. \* $p < .05$ ; \*\*\* $p < .000$ .

but there was a trend for older parents to assign lower scores to their infants on the Problem scale (Pearson  $r = -.14$ ,  $p \leq .06$ ).

### Effect of Children's Gender and Age on BITSEA Ratings

Data analysis revealed no significant difference either on the BITSEA Problem scale or on the Competence scale as related to children's gender. However, consistent with the developmental nature of the BITSEA Competence scale, Competence scores significantly increased with the

children's age (Pearson  $r = .37$ ,  $p \leq .000$ ). Conversely, correlation between BITSEA Problem scores and children's age was close to nil (Pearson  $r = .004$ ,  $p \leq .93$ ).

### Parental Appraisal of the BITSEA's Easiness of Rating and Usefulness

The BITSEA was globally perceived by parents as both easy to rate ( $M = 7.54$ ,  $SD = 2.47$ , minimum = 0, maximum = 10) and useful ( $M = 6.94$ ,  $SD = 2.87$ , minimum = 0, maximum = 10, see Table I).

Table IV. Correlations of BITSEA Items With Problem and Competence Scales (Multitrait-Multimethod Approach)

Items	Scale	Correlations Competence scale	Correlations Problem scale
BITSEA.1	Competence	0.15	-0.02
BITSEA.5	Competence	0.34	-0.22
BITSEA.10	Competence	0.10	0.16
BITSEA.13	Competence	0.20	-0.06
BITSEA.15	Competence	0.22	-0.10
BITSEA.19	Competence	0.31	-0.06
BITSEA.20	Competence	0.30	-0.03
BITSEA.22	Competence	0.45	-0.02
BITSEA.25	Competence	0.34	-0.01
BITSEA.29	Competence	0.33	-0.04
BITSEA.31	Competence	0.39	-0.10
BITSEA.2	Problem	-0.06	0.26
BITSEA.3	Problem	-0.15	0.37
BITSEA.4	Problem	-0.14	0.32
BITSEA.6	Problem	-0.02	0.22
BITSEA.7	Problem	-0.11	0.37
BITSEA.8	Problem	0.08	0.22
BITSEA.9	Problem	-0.11	0.15
BITSEA.11	Problem	0.01	0.29
BITSEA.12	Problem	-0.01	0.35
BITSEA.14	Problem	-0.17	0.12
BITSEA.16	Problem	0.06	0.19
BITSEA.17	Problem	-0.03	0.26
BITSEA.18	Problem	0.04	0.29
BITSEA.21	Problem	-0.03	0.22
BITSEA.23	Problem	-0.02	0.30
BITSEA.24	Problem	-0.03	0.15
BITSEA.26	Problem	0.03	0.18
BITSEA.27	Problem	0.06	0.31
BITSEA.28	Problem	0.02	0.40
BITSEA.30	Problem	0.00	0.37
BITSEA.32	Problem	0.01	0.26
BITSEA.33	Problem	0.01	0.35
BITSEA.34	Problem	0.08	0.18
BITSEA.35	Problem	0.03	0.17
BITSEA.36	Problem	0.01	0.19
BITSEA.37	Problem	-0.05	0.31
BITSEA.38	Problem	0.03	0.26
BITSEA.39	Problem	-0.10	0.17
BITSEA.40	Problem	-0.09	0.15
BITSEA.41	Problem	-0.10	0.26
BITSEA.42	Problem	-0.19	0.22

### Discriminative Validity: Correlation Between Parental Worries and BITSEA Scores

As expected, BITSEA Problem score significantly increased with level of parental worry ( $r = .34$ ; 95% CI 0.21–0.47), whereas BITSEA Competence score was negatively

correlated with parental level of concern about their child ( $r = -.11$ ; 95% CI -0.23 to -0.003).

### Discussion

The present study assessed the psychometric properties of the French version of the BITSEA questionnaire in a low-risk sample of infants and their parents. Overall results showed that the French BITSEA has satisfactory psychometric performance in terms of internal consistency of both BITSEA dimensions, and of convergent, discriminant, construct, and concurrent validity. Similar to previous studies with the BITSEA, screening qualities of the BITSEA for the detection of early social-emotional difficulties and development problems were compared with those of the CBCL 1½–5 (Achenbach & Rescorla, 2000). As expected and in line with previous results (Briggs-Gowan et al., 2004; Haapsamo et al., 2012; Karabekiroglu et al., 2009; Kruizinga et al., 2012), scores on the BITSEA Problem scale were found to be positively correlated to those given on all CBCL subscales. Conversely, as hypothesized, correlations between scores on the BITSEA Competence scale and CBCL scales were all very small, and mostly negative. Besides, the BITSEA has also demonstrated its ability to distinguish between parents who reported having worries about their child's behavior, emotions, or relationships and parents who were not worried. As reported previously by Kruizinga et al. (2012), BITSEA Problem scores significantly increased with level of parental worry, whereas BITSEA Competence score was negatively correlated with parental level of concern about their child. Thus, to some extent, the BITSEA allows a faster screening of a quite similar group of social and emotional symptoms to those assessed by the CBCL 1½–5, while providing at the same time a screening on competence delays or deficits. There are actually only a few social and emotional assessment tools that offer the opportunity to check infant/child development for both dimensions: difficulties/symptoms and competences. In addition, by routinely assessing competences, practitioners may be more prepared to identify strengths that can be capitalized on during the child's treatment process.

Consistent with the developmental nature of the BITSEA Competence scale and with previous studies (Briggs-Gowan et al., 2004; Karabekiroglu et al., 2009), Competence scores significantly increased with the children's age, whereas Problem scores were not associated to children's age. However, in contrast with other studies (Carter, Briggs-Gowan, & Davis, 2004; Kruizinga et al., 2012), results from the present study do not show any



Table V. Confirmatory Factor Analysis of BITSEA Scales

Scale/items	Estimates	SE	Z-value
BITSEA Competence			
BITSEA.1	1.00		
BITSEA.5	3.52	1.03	3.40**
BITSEA.10	0.79	0.48	1.63
BITSEA.13	1.73	0.61	2.86**
BITSEA.15	1.55	0.52	2.99**
BITSEA.19	2.16	0.65	3.30**
BITSEA.20	3.25	0.96	3.39**
BITSEA.22	5.99	1.71	3.51**
BITSEA.25	4.12	1.16	3.53***
BITSEA.29	3.34	0.96	3.48**
BITSEA.31	5.15	1.45	3.56***
BITSEA Problem			
BITSEA.2	1.00		
BITSEA.3	1.60	0.31	5.08***
BITSEA.4	1.75	0.31	5.63***
BITSEA.6	1.08	0.30	3.65***
BITSEA.7	1.45	0.29	4.96***
BITSEA.8	1.08	0.29	3.72***
BITSEA.9	0.26	0.11	2.30**
BITSEA.11	1.58	0.31	5.14***
BITSEA.12	1.00	0.23	4.34***
BITSEA.14	0.55	0.21	2.66*
BITSEA.16	0.69	0.22	3.20**
BITSEA.17	1.20	0.33	3.63***
BITSEA.18	1.66	0.34	4.89***
BITSEA.21	1.12	0.34	4.89***
BITSEA.23	1.46	0.32	4.49***
BITSEA.24	0.38	0.15	2.44*
BITSEA.26	0.70	0.21	3.38**
BITSEA.27	1.47	0.28	5.23***
BITSEA.28	1.65	0.31	5.26***
BITSEA.30	1.94	0.40	4.90***
BITSEA.32	0.42	0.16	2.61*
BITSEA.33	1.42	0.31	4.55***
BITSEA.34	0.70	0.22	3.19**
BITSEA.35	0.70	0.21	3.33**
BITSEA.36	0.50	0.19	2.65*
BITSEA.37	1.07	0.27	3.99***
BITSEA.38	0.76	0.20	3.83***
BITSEA.39	0.57	0.16	3.60***
BITSEA.40	0.20	0.08	2.40*
BITSEA.41	0.91	0.22	4.15***
BITSEA.42	1.17	0.27	4.25***

Note. \* $p < .05$ ; \*\* $p < .001$ ; \*\*\* $p < .000$ .

significant difference on the BITSEA Problem or Competence scores as related to children's gender. Although social and emotional symptoms are generally thought to be more prevalent in boys, available results

derived from parental assessments of infant and toddler behavior do not converge on this topic, in particular for very young children. Karabekiroglu et al. (2009) found that only fathers' ratings of BITSEA Competence scale for girls were higher than for boys. In a clinical sample of toddlers, the same team found that parental ratings on the BITSEA Problem scale were not significantly different across boys and girls (Karabekiroglu et al., 2010). Briggs-Gowan et al. (2004) found that boys have lower scores on the Competence scale than girls, but that this was not true for the youngest age range (12–17 months). Haapsamo et al. (2012) found that boys had higher mean scores than girls only on BITSEA items related to autism spectrum disorders and only when children were 36 months old. Using the Ages and Stages Questionnaires-Social-Emotional (ASQ-SE) (Squires, Bricker, & Twombly, 2002), Squires, Bricker, and Twombly (2004) did not find any gender effect for infants and toddlers aged less than 30 months either. Thus, it is likely that the lack of gender effect may be owing to the relatively low average age of the children in the present sample (19 months). Shaw, Owens, Giovannelli, and Winslow (2001) argued that social and emotional differences between boys and girls may become more pronounced as children age increases, reflecting to some degree the impact of social environment on their behavioral and developmental repertoires, maybe including the unfolding of social-emotional and behavioral symptoms.

The results support the factor structure of the BITSEA. The BITSEA Problem and Competence scales had acceptable internal consistency and most factor loadings were in the adequate range. All but two items were positively correlated to their dimension of origin, whereas correlations to the opposite dimension were low (negative) to null. In line with other studies on the BITSEA, Problems and Competences appear to be distinct constructs, as nonsignificant or low negative correlations are consistently observed between them (Briggs-Gowan & Carter, 2007). Two items (Item 10, Looks for you (or other parent) when upset, from the Competence scale, and Item 14, Does not react when hurt, from the Problem scale) did not behave as expected, and some of the BITSEA items had low loadings (lower than .30). However, as noted by Briggs-Gowan et al. (2004), these findings are not surprising, given that both the Problem and Competence scales include a comprehensive array of behaviors that are not expected to co-occur consistently.

The present study also aimed at exploring the links between infant/toddler social and emotional problems or delays, and parental stress and difficulties with the child, as measured by the PSI-SF (Abidin, 1995). BITSEA Problem

Table VI. Correlations Between BITSEA, CBCL 1½–5, and PSI-SF Scores

Subscales	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. BITSEA_P	1.00	−0.09*	0.24***	0.13**	0.32***	0.24***	0.36***	0.36***	0.42***
2. BITSEA_C		1.00	−0.14**	−0.16***	−0.19***	−0.20***	−0.10	0.00	−0.01
3. PSI_PD			1.00	0.69***	0.57***	0.86***	0.16**	0.08	0.10
4. PSI_PCDI				1.00	0.79***	0.93***	0.06	0.04	0.05
5. PSI_DF					1.00	0.89***	0.25***	0.20***	0.23***
6. PSI_Total						1.00	0.14*	0.08	0.09
7. CBCL_I							1.00	0.67***	0.88***
8. CBCL_E								1.00	0.91***
9. CBCL_Total									1.00

Note. Pearson *r* correlations.

BITSEA = Brief Infant-Toddler Social Emotional Assessment; PSI = Parenting Stress Index-Short Form; CBCL 1½–5 = Child Behavior Check List 18 months to 5 years;

BITSEA\_P = Problem score; BITSEA\_C = Competence score; PSI-PD = Parental Distress; PSI-PCDI = Parent-Child Dysfunctional Interaction; PSI-DF = Difficult child;

CBCL\_I = Internalizing; CBCL\_E = Externalizing.

\**p* < .05; \*\**p* < .001; \*\*\**p* < .000.

scores were found to be positively and significantly correlated to all PSI-SF scales, whereas BITSEA Competence scores were negatively correlated to PD scores. Briggs-Gowan and Carter (2007) also found that child social and emotional difficulties identified with the BITSEA Problem scale were correlated to parental ratings on the PSI-SF DF scale. Besides, CBCL subscores were also positively correlated to the DF scale and, to a less extent, to PD and PSI-Total scales. However, contrary to our expectations, scores on PCDI scale were not correlated to any of the CBCL subscales. High scores on the PCDI scale means that the parent has reduced levels of satisfaction derived from interaction with the child and that the child does not meet parental expectations. Thus, child symptoms do not necessarily affect parental satisfaction with interaction and expectations in a negative way. Nonetheless, these findings suggest that many parents whose children display social and emotional difficulties or developmental delays may be struggling to cope with parenting stress. Addressing the burden and strain that parents are experiencing may encourage them to accept the child's referral and to engage more effectively in their child's treatment.

The BITSEA questionnaire was globally perceived by the parents as easy to rate, and as a useful tool, which is of clear relevance to the appropriateness of the BITSEA for widespread and routine screening. In addition, it should be noted that response rate in the present study was 76.49%, which is a rather high rate, and is actually the double of that obtained in the French validation of ITSEA long version (38%), with parents of infants met in well-child clinics and daycare centers (Bracha et al., 2004). This can be explained by the fact that most parents in the present study completed the questionnaires on site instead of returning

the questionnaires by postal way. In addition, research psychologists were available to respond to any question from the parents about the questionnaires on site or by telephone. Another factor is that the BITSEA is a briefer questionnaire than the ITSEA (42 and 166 items, respectively). However, parents in the present study also completed the CBCL and the PSI-SF scales, whereas in the ITSEA validation study, parents completed only the ITSEA questionnaire. In addition, a comparative analysis on missing data between the two different settings (public health/well-baby clinics and daycare centers) revealed that BITSEA questionnaires with at least one missing item were more frequent for parents met in public health/well-baby clinics than in daycare settings. This means that quality of parental response to screeners may be of good level even when questionnaires are returned by postal way. Thus, brief screening tools addressing child development and parental concerns are likely to be well accepted by parents in the context of routine medical checkups or in childcare settings. Moreover, it should be underscored that care providers met in the different settings of the present study showed cooperative attitude and interest toward the use of the BITSEA. Therefore, although its acceptability has not been tested with health or childcare providers in this study, the BITSEA appears as a promising and practically applicable screening tool in primary health-care clinics and daycare centers.

One limitation of the present study is that some sociodemographic data of the parents having completed the questionnaires could not be collected, and therefore, we were not able to examine whether differences in factors such as parental education and literacy, professional status, ethnic origin, income, housing conditions, and family

structure could affect parental ratings on child characteristics. Other authors have reported that the accuracy of parental reporting is not influenced by sociodemographic factors or by maternal educational level (Johnson et al., 2004; Kim, O'Connor, McLean, Robson, & Chance, 1996). However, Kruizinga et al. (2012) found that immigrant children had higher mean scores on the BITSEA Problem scale compared with native ones. In addition, respondent test–retest and inter-rater reliability could not be assessed. It should be also acknowledged that, given the lack of available tools covering the same children's behaviors and age range, we have used the CBCL on children aged from 12 months, whereas this tool has only been validated on children from 18 months upward. This is also the case for the other validation studies of the BITSEA. Our study also involved only a limited number of at-risk children (e.g., presenting symptoms of pervasive developmental disorders or of disruptive behavior disorders), and further research with a greater number of children presenting risk factors, as well as with children received in clinical settings, is warranted to examine the validity of the BITSEA as a screening tool with this population. Thus, although the BITSEA demonstrated good validity relative to multitrait-multimethod approaches and CFAs, these findings do not address the clinical validity of the BITSEA. Additional work is needed to determine to what extent the original statistical cutoffs recommended for the BITSEA Problem and Competence scales are able to identify French children who exhibit clinically significant problems or delays in the acquisition of social–emotional competences. It is important to establish culturally appropriate cutoff scores that enable the assessment of clinically relevant problems or delays for the French population.

If practitioners assume a family-centered perspective, parental involvement in the assessment process becomes a key step in the establishment of a child's developmental status. This implies the recognition and the use of the parents' unique knowledge of their child's difficulties and capabilities. Several studies have indeed confirmed that parents are capable of assessing their child's performance, and that their concerns over development are generally well founded (Glascoe & Dworkin, 1995; Heiser et al., 2000; Tervo, 2005). Even though direct observation and clinical assessment of infant/toddler's behaviors and parent–child interaction remain a gold standard for diagnosis and assessment, these procedures are time-consuming and may not be representative of the child's overall behavior repertoire in other settings. Screening tools may improve the identification of at-risk children who might warrant additional assessment, intervention, and follow-up. Parent-completed questionnaires such as the BITSEA also have

the advantage that they can be administered by the parent in their own home, and in the child's natural environment, before their clinic appointment, encouraging parents to pay attention to their child's behaviors and enabling the clinician to have test results available directly at the consultation. Comprehensive and longitudinal assessments of the social–emotional functioning of children with different types of social and emotional problems and developmental delays can provide important insights into the etiology, course of, and response to treatment of social–emotional/behavioral problems and delays in competence. Such insights are likely to have important implications for efforts to intervene effectively with children with cognitive, language, and/or motor delays, as well as with children with social–emotional symptoms or disorders. However, the dissemination of first-level screening programs, to help ensure the early and accurate identification of young children with mental health problems, still remains a challenge in many countries around the world.

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