

## Measuring the Foundations of School Readiness: Introducing a new questionnaire for teachers - the Brief Early Skills and Support Index (BESSI)

Claire Hughes, Irene Daly, Sarah Foley, Naomi White and Rory T. Devine

Centre for Family Research, University of Cambridge, UK

Address correspondence to: Prof Claire Hughes, Centre for Family Research, University of Cambridge, Free School Lane, Cambridge CB2 3RQ, UK ([ch288@cam.ac.uk](mailto:ch288@cam.ac.uk)). This research was funded by the Westminster Foundation and the Foundation Years Trust. We would like to express our sincere thanks to all the teachers and nursery staff who took part in this study. This study was funded by the Westminster Foundation (Dr Daly), the University of Cambridge Isaac Newton Trust (Dr Devine) and the Foundation Years Trust (Ms Naomi White & Ms Sarah Foley).

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## Abstract

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Measuring the Foundations of School Readiness: Introducing a new questionnaire for teachers - the Brief Early Skills and Support Index (BESSI)

What exactly is school readiness? Evidence that children's early adjustment and development predict important long-term outcomes (e.g., Keating & Hertzmann, 1999) has attracted great research interest, but a formal definition of school readiness has yet to be widely agreed. For politicians and many parents, school readiness hinges on achieving foundation skills in literacy and numeracy (Barbarin et al., 2008). Teachers, however, are more likely to highlight the importance of children's behavior and socio-emotional development (e.g., Lin, Lawrence, & Gorrell, 2003). Encompassing each of these views therefore requires a multi-dimensional approach (e.g., Bierman et al., 2008). Accompanying this definitional discourse is a shift in theoretical and practical perspectives. A key goal of early maturational views was to identify children who are unlikely to thrive in a mainstream educational setting; in contrast, more recent policies have emphasised the need to identify the kind of educational environment that can ensure universal success (e.g., The No Child Left Behind Act (U. S. Department of Education, 2001)).

We begin this introduction by arguing that adopting a broader definition of school readiness allows one to replace formal assessments with less time-consuming survey-based methods. We then introduce an existing and widely used questionnaire measure, the Early Development Instrument or EDI, before outlining three key limitations of this tool and providing a rationale for developing a new instrument. Finally we identify family and child predictors that are likely to contribute to individual differences in children's ability to make a successful transition to school or nursery.

The Need for an Instrument to Gather **Teachers'** Ratings of School Readiness

Broadening the definition of school readiness to encompass children's ability to meet everyday social and practical challenges (e.g., responding appropriately to peers and playing an active role in learning) raises important questions about measurement. The focus on specific cognitive skills (e.g., in literacy and numeracy) within the traditional maturational model led to the development of several psychometric tests that were well suited to identifying the small numbers of children with learning difficulties. However, individual testing is time-consuming and so not appropriate for identifying the relatively large numbers of young children with mild delays who might benefit from more support *within* school. Moreover, the recognition of problems in regulating behavior and emotion as key barriers to school readiness has led to a parallel broadening in assessment methods, as these problems are often best identified via teacher ratings. Together, these limitations (of time demands and narrow focus) of traditional assessments highlight the need for simple questionnaire measures.

In response to this void, a Canadian research group developed a multi-dimensional rating system, the Early Development Instrument (EDI) that enables teachers to monitor pre-school children's developmental health and wellbeing. The EDI has five distinct (social, emotional, physical, cognitive and communicative) sub-scales (Janus & Offord, 2007). To date, the EDI has been administered to a large population sample of 16,000 4 and 5 year olds in Canada (Janus & Offord, 2007), as well as similarly aged children in many different countries (Brinkman et al., 2012b; Curtin, Baker, Staines, & Perry, 2014; Hagquist & Hellström, 2014; Ip et al., 2013; Janus, Brinkman, & Duku, 2011; Woolfson, Geddes, McNicol, Booth, & Frank, 2013). Most recently, an adapted version of the EDI has been used in a national census of 261,147 Australian 5 year olds (i.e., 97% of all 5 year olds in the population), which revealed regional disparities in the proportion of children with

‘developmental vulnerabilities’, defined by scores in the bottom decile for each sub-scale (Brinkman et al., 2012a).

### Limitations of the Early Development Instrument (EDI)

Although the EDI is clearly a very useful instrument, it is open to at least three different kinds of criticism. The simplest of these concerns its length: at 7 pages (104 items), the EDI could easily take a teacher up to 10 hours to complete for a class of 30 children. The second limitation of the EDI concerns the complexity of many of the items (e.g., those relating to milestones in literacy and numeracy). As noted earlier, the EDI was designed in Canada, a country that has an average school entry age of 5.5 years. The more complex items in the EDI are entirely appropriate for this age group, but are not suitable for rating younger children. Indeed, the Australian census study systematically excluded data from children below the age of 4 years, as these children were considered to be too young to attend full-time schooling. In the UK, however, children receive state support from the age of 3 to attend pre-school for 15 hours per week and many do attend full time. Indeed, for low-income families in the UK, government nursery vouchers are also offered to 2 year olds. To assess these children, a new instrument is needed that is applicable to the particular issues that arise when very young children attend educational settings. For example, our initial focus group discussions highlighted the salience of specific practical skills such as independent use of a toilet, as well as matters of safety (e.g., the ability to use sharp objects such as scissors or forks).

The third and perhaps most important criticism of the EDI reflects the general argument that ‘school readiness’ should not be conceptualised solely in terms of child characteristics. Given the inequalities of experience and resources in society, some theorists (e.g., High et al., 2008) have argued that the term “school readiness” is both unfair and

unhelpful as it appears to place the burden of responsibility for successful school transitions on the child. Instead, these theorists have proposed an interactive model in which families, schools and communities share a joint responsibility for children's school readiness (e.g., Chien et al., 2010; Williford, Maier, Downer, Pianta, & Howes, 2013). Thus, while the EDI is a valuable step forward from more traditional measures that adopt a narrow focus on academic skills, it falls short of recognizing that individual difficulties in children's school readiness often reflect contrasting experiences at home.

### Rationale for Developing the Brief Early Skills and Support Index

While detailed measures of school readiness such as the EDI have obvious merits, we sought to construct a simpler tool that would minimise the burden on teachers. This is an important goal, as increased workloads resulting from unprecedented levels of governmental targets and curriculum changes have led to widespread problems of stress and fatigue among teachers in Britain. In a national survey of 5,497 working adults, 15% of teaching professionals met diagnostic criteria for a common mental disorder, a prevalence rate that was almost twice as high as in many other professional groups (Stansfeld, Rasul, Head, & Singleton, 2011). In constructing a brief (one page) questionnaire that could be used to identify children in need of extra support during the transition to school or nursery, we took as our inspiration Goodman's (1997) Strengths and Difficulties Questionnaire. In particular, the brevity of the SDQ has made it a valuable alternative to the in-depth Child Behavior Check List (Achenbach, 1991). Indeed the SDQ has now been used in numerous population cohort studies (Griffiths, Dezateux, & Hill, 2011; O'Connor, Heron, Golding, Beveridge, & Glover, 2002; Wilson et al., 2013).

A second motivation for the current study was to develop an instrument that, unlike the EDI, could be used to rate both early school-age children *and* pre-schoolers. In some respects, tailoring the questionnaire to younger children also helped to reduce its length. This

is because children's cognitive development is, in general, characterized by progressive modularization (i.e., a shift from global to domain-specific) (Karmiloff-Smith, 1998). Domains that appear distinct in school-age children (e.g., cognitive and communicative skills; social and emotional skills) are more closely inter-related in younger children and so could be combined. Our discussions with teachers also highlighted the salience of 'daily living skills' for very young children attending school or nursery and so we included a new subscale to capture these practical skills (e.g., independent use of a toilet; ability to put on a coat). Designing an instrument that is suitable for younger children is also valuable for developing and evaluating interventions in order to promote evidence-based policies. In particular, interventions are known to be more effective when they are applied before problems become entrenched (Bywater, 2012), such that it is important for educational professionals to be able to identify children in need of extra support from a very early age. Reflecting this view, policymakers have, in recent years, emphasised the importance of the first one thousand days of life (Allen, 2011).

Finally and perhaps most importantly, by assessing family support, our measure also builds upon growing research evidence that children's long-term development and adjustment depends upon both early life stress (e.g., Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Shonkoff, Boyce, & McEwen, 2009) and supportive relationships that can foster children's resilience (Ungar, 2015; Wessells, 2015). This view was also forcefully expressed by the teachers who took part in focus groups conducted at the start of the current study, leading to the inclusion of a separate subscale for family support. Note that our selection of items (relating to attendance, punctuality, praise, home reading, talk about fun at home) was guided by thoughts about what teachers might reasonably be expected to know about family life.

Family Income and Support as Predictors of **Children's** Adjustment and Development



A key argument for early entry into formal education is that it offers children from low-income families a chance to narrow the achievement gap and so break intergenerational cycles of disadvantage. Social mobility in the UK has dropped dramatically over the past generation, such that it is now lower than in Canada, Germany and Scandinavia (but on a par with the USA) (Blanden, Gregg, & Machin, 2005; Dorling, 2012). Moreover, research findings consistently highlight contrasts in educational aspirations and achievement as pivotal to this problem of social immobility (e.g., Engle & Black, 2008; McLoyd, 1998). Externalizing problems in childhood show a similar social gradient (e.g., Attridge-Stirling, Davis, Day, & Sclare, 2001; Korenman, Miller, & Sjaastad, 1995) and findings from several studies indicate that this association is largely explained by contrasts in parenting quality (e.g., Brooks-Gunn, Duncan, & Aber, 1997; Maughan, 2001).

In recent years, researchers have focused on socio-economic contrasts in parental support for reading (e.g., Hartas, 2011). However, evidence that attachment security predicts both cognitive performance (e.g., Moss & St-Laurent, 2001) and academic achievement (West, Mathews, & Kerns, 2013) suggests that general differences in the quality of parent-child interactions are at least as important as specific parenting practices. West et al. (2013) found that children's self-regulation, cooperative skills and peer relationships at least partly mediated the link between early attachment and later academic achievement. These findings point to the value of assessing different aspects of both family support and children's well-being and development as disparities in family support are likely to be closely associated with contrasts in children's 'school readiness'.

#### Child Predictors of Adjustment and Development: Gender and Birth Order

Concerns about the early age of school entry in the UK typically focus on boys, who show poorer literacy skills than girls (e.g., Hammer, Farkas, & Maczuga, 2010; Logan &

Johnston, 2009) and are more likely to receive a diagnosis of conduct disorder (Office of National Statistics, 1999, 2004), which in turn is strongly associated with academic failure (Carroll, Maughan, Goodman, & Meltzer, 2005; Kessler, Foster, Saunders, & Stang, 1995). However, gender differences in child psychopathology vary considerably in magnitude by informant (Rutter, Caspi, & Moffitt, 2003) and agreement between informants is, at best, only moderate (De Los Reyes, Henry, Tolan, & Wakschlag, 2009). This variation across informants indicates an ‘eye-of-the-beholder effect’, highlighting the need to assess the measurement equivalence of adjustment ratings for girls and boys.

Disparities may also exist within families. Evidence from several studies shows a modest but consistent advantage in language ability for first-born or only children (e.g., Berglund, Eriksson, & Westerlund, 2005; Fenson, Dale, Reznick, & Bates, 1994). Parent-infant interaction is a key predictor of language development (for a recent review, see Topping, Dekhinet, & Zeedyk, 2013) and so the most plausible explanation for this contrast hinges on differences in parents’ availability and talk to first-born versus later-born children (Hoff-Ginsberg, 1998). To our knowledge, however, studies have yet to examine whether first-born children receive greater family support at key transitional periods, such as the start of nursery or school.

### Summary of Study Goals

Our main goal was to develop a questionnaire that would provide a useful alternative to the EDI through three key features: (i) brevity; (ii) suitability for rating both very young children and children in the early school years; and (iii) a definition of school readiness that encompassed not only a broad set of child skills but also support from families. Beyond evaluating the psychometric properties of this questionnaire (including its test-retest reliability), we also aimed to extend the scope of existing research and examine the construct

validity of the BESSI through the analysis of links between child adjustment / development and both family and child predictors.

## Methods

### Constructing the Brief Early Skills and Support Index (BESSI)

Figure 1 provides an overview of the study methods. Following standard psychometric procedures for developing a questionnaire (e.g., Rust & Golombok, 2009) we began with an initial grid of 80 items measuring children's language & cognition, daily living skills, social and emotional development, and self-regulation. To improve the ease and speed of administration the items in this grid were modified to follow a single format: a statement followed by four alternative response categories (strongly agree / agree / disagree / strongly disagree). The items in the grid were based on items in existing measures (e.g., the Early Development Instrument (Janus & Offord, 2007), the Vineland Adaptive Behavior Scale (Sparrow, Balla, & Cicchetti, 1984), Self-Control Rating Scale (Kendall & Wilcox, 1979) but then modified following responses from 23 nursery and reception teachers at 18 schools who were invited to comment on the wording and the appropriateness of individual items. Eleven out of these 18 schools sent representatives to attend focus groups which were conducted separately with (a) nursery / reception teachers and (b) head-teachers (in total, 32 teachers took part in these focus groups). From these teachers' feedback, we generated a 50-item questionnaire which included items about family support as well as the child's behavior and abilities. Thirty nursery and reception teachers completed this 50-item questionnaire for 185 children (98 boys). The final 30 items were then selected (by excluding items that showed poor discrimination or limited variance in item response curves) to provide information about social skills, self-regulation, daily living skills, language and cognition and family support.

### Recruitment and Sample

Initial recruitment was assisted by local education authorities who paid teachers to attend focus groups. In this paper we report findings from two independent samples. For the main study, a total of 1542 questionnaires were gathered from 44 teachers at 32 primary schools and 54 nursery teachers at 29 nurseries in the Wirral in the North West of the UK. We excluded those questionnaires from which age could not be calculated ( $N = 52$ ) and those in which teachers did not report the child's gender ( $N = 17$ ) or complete any of the questionnaire items ( $N = 1$ ). We also excluded 12 questionnaires for children aged below 2.50 years and 4 questionnaires for children aged over 5.50 years. This resulted in a final sample of 1456 children. Table 1 shows the characteristics of the final sample. The Wirral has above average levels of child poverty in the UK (Wirral Joint Strategic Needs Assessment, 2014), and the proportion of children in the sample eligible for free school meals (24.5%) is higher than the national average of 18% (Iniesta-Martinez & Evans, 2012).

The second sample was a group of 258 children (144 girls, 114 boys) for whom we were able to gather questionnaire data at two time-points approximately 1 month apart in order to examine the test-retest reliability of the BESSI. This sample of children were attending 10 different classes in two distinct geographical regions of the UK (the North West and South East) and ranged in age from 3.07 to 5.84 years,  $M = 4.35$  years,  $SD = .66$ , with 136 in Nursery and 122 in Reception. This sample was diverse both ethnically (48% White British) and socially (23% eligible for free school meals). The mean interval between the two time-points was 33.59 days,  $SD = 6.88$  days, *Range*: 25 – 50 days.

## Results

We begin by addressing the first study goal by describing children's scores on the BESSI at an item level and presenting the measurement properties of the BESSI. For each subscale we use latent variable modelling to examine the factor structure, gender invariance, between-

classroom effects and test-retest reliability. Next, we turn to the second study goal, by using structural equation models to examine family and child correlates of individual differences in BESSI ratings.

### Missing Data and Descriptive Statistics

Supporting the view that the BESSI is quick and easy to complete, missing data on the BESSI items for the full sample of 1456 children was very low, ranging from 0 to 5.6% on all but one item. The one exception, ‘Regularly reads at home’, was missing for 11% of cases. To assess the pattern of missing data for ‘Regularly reads at home’, we conducted a binary logistic regression in which a dummy variable for item nonresponse was regressed onto age, gender, free school meal status, ethnicity, presence of an older sibling and the other 29 BESSI items. Given the large number of predictor variables in this regression, we adopted a more stringent alpha of .01. The regression revealed that age,  $B = -1.36$ ,  $SE = .34$ ,  $Wald(1) = 15.61$ ,  $p < .0001$ , was the only significant predictor of missing data on this item. Specifically, teachers were less likely to report data for younger children, likely reflecting the heightened emphasis on literacy (e.g., book bag systems) in the first year of primary school compared with nursery classes. No other questionnaire item or demographic variable predicted nonresponse on this item. It is therefore likely that the missing data for the ‘Regularly reads at home’ item met the assumptions for being missing at random (MAR) (e.g., Acock, 2005). To avoid loss of data, we estimated missing values using mean- and variance-weighted least squares (WLSMV) in Mplus. The demographic section also contained missing data (for which we used list-wise deletion): ethnicity for 31 cases (2.1%), presence of an older sibling for 35 cases (2.3%), diagnosis with special educational needs for 58 cases (3.9%) and free school meal status for 250 cases (16.9%), almost all of whom were attending nurseries part-time.

Table 2 shows descriptive statistics for each BESSI item in the whole sample and divided by age, gender and free school meal status. Responses to each item ranged from 1 (agree strongly) to 4 (disagree strongly) such that higher scores indicated greater risk. For consistency, we reverse-scored the negatively worded items (marked with an asterisk \* in Table 2). As there was marked positive skew in the response patterns for the majority of BESSI items, we recoded them into binary indicators of risk, categorizing scores of 1 and 2 as indicating ‘no risk’ and scores of 3 and 4 as indicating ‘risk’.

For 8 items more than 25% of the sample fell into the ‘risk’ category: ‘easily distracted’ (46.8%); ‘trouble sitting still’ (34.9%); ‘needs help with belongings’ (29.9%); ‘enjoys identifying letters’ (28.2%); ‘often interrupts’ (27.5%); ‘easily frustrated’ (26.7%); ‘talks about fun at home’ (25.9%); ‘able to work independently’ (25.8%). As indicated in Table 2 there were significant age-related differences in performance on 6 items with older children being less likely than younger children to fall into the ‘risk’ category. There were significant gender differences on 20 items with boys being more likely than girls to fall into the ‘risk’ category. Finally, supporting the sensitivity of the BESSI to contrasts in adjustment and development associated with family poverty, 18 items showed that children eligible for free school meals were significantly more likely than their peers to be categorized as ‘at risk’.

## Measurement Properties of the BESSI

### Factor structure of the BESSI.

Table S1 shows the tetrachoric correlation matrix for the 30 items of the BESSI. In order to identify the best fitting measurement model for the 30 indicators of the BESSI, we compared the fit of 5 non-nested latent factor models using confirmatory factor analysis. We estimated the model parameters with a mean- and variance-adjusted weighted least squares estimator in Mplus version 6 (Muthén & Muthén, 2011). We assessed model fit using the

following criteria: Root Mean Square Error of Approximation (RMSEA)  $\leq .05$ , Comparative Fit Index (CFI)  $\geq .90$  and Tucker Lewis Index (TLI)  $\geq 0.90$  (Brown, 2006; Kline, 2011). In each of the subsequent models we specified no cross-loading items and no correlated errors. In Model 1 we tested a single factor solution in which all 30 items loaded onto one latent factor. In Model 2 we tested a two factor solution in which the 24 items pertaining to children's abilities and behaviors loaded onto one latent factor and the 6 items assessing children's family support loaded onto a second correlated latent factor. In Model 3 we tested a solution containing three correlated latent factors. The first latent factor contained 12 items relating to children's self-regulation and social-emotional skills. The second latent factor contained 12 items relating to children's language and cognition and daily living skills. The third latent factor contained 6 items assessing children's family support. In Model 4 we evaluated a solution containing four correlated latent factors: a 12-item Behavioral Adjustment factor (containing items relating to self-regulation and social-emotional skills), a 6-item Language and Cognition factor, a 6-item Daily Living Skills factor and a 6-item Family Support factor. In Model 5 we assessed a solution containing 5 correlated 6-item factors: Self-regulation, Social-emotional skills, Language and Cognition, Daily Living Skills and Family Support. Table 3 shows the fit indices for each of these models.

Although Model 5 exhibited good fit, the solution was inadmissible as the latent variable covariance matrix was not positive definite. The standardized covariance between the self-regulation and social-emotional skills latent factors exceeded acceptable values. Model 4 therefore provided the best fit to the data. Table 4 shows the unstandardized and completely standardized parameter estimates for this final measurement model as well as the standardized covariances between the four latent factors. Cronbach's alpha values for the raw scores of each of these latent factors were: .88 for Behavioral Adjustment, .76 for Language and Cognition, .67 for Daily Living Skills and .69 for Family Support.

### Measurement invariance of the BESSI across boys and girls.

To assess the suitability of the BESSI for boys and girls we used multiple-groups CFA to assess the measurement invariance of the four-factor solution. We first tested a baseline model (Model 6) in which the four latent factors were specified to have equal form, loadings and thresholds across boys and girls. In the next four models (Models 7, 8, 9 & 10) we constrained the latent factor variances to equality one factor at a time. We assessed whether each successive constraint resulted in a significant change in  $\chi^2$  relative to the previous solution. Table 3 shows the model fit indices and  $\chi^2$  difference test results for each of these models. There was a significant degradation in model fit when the variance of the Family Support latent factor was constrained to equality for boys and girls (Model 10). We therefore released this constraint.

Having demonstrated the measurement invariance of three of the four latent factors, we examined whether there were gender differences in each of the three invariant latent factors of the BESSI. Taking each factor separately, we constrained the means of each latent factor to be equal for boys and girls (Models 11, 12 & 13). Table 3 shows that there were significant latent mean differences between boys and girls on each of the three invariant latent factors. Specifically, compared with girls, boys exhibited more problems in Behavioral Adjustment,  $d = 0.52$ ,  $p < .0001$ , Language and Cognition,  $d = 0.47$ ,  $p < .0001$ , and Daily Living Skills,  $d = 0.64$ ,  $p < .0001$ . Together these findings indicate that three of the four latent factors functioned equally well for boys and girls and showed genuine latent mean differences by gender.

### Multilevel modelling of the BESSI: The role of between-teacher differences.

The BESSI data were obtained from 98 different respondents each of whom rated a small group of children (Range:  $6 \leq N \leq 33$ ). Like data from other observational instruments,



the BESSI ratings were clustered together and so variance in ratings might be due to both child-level variation (i.e., individual differences) and teacher- or class-level variation (Byrne, 2012; Muthén, 1997). To assess the proportion of total variance in each item accounted for by between-teacher variance, we calculated intra-class correlations (ICCs) for each of the 30 BESSI items (Muthén, 1997). Given that the ICCs (see Table 4) were greater than .10 for all items, we specified a multilevel CFA to examine whether the four correlated latent factors measurement model provided a good fit to the data once between-teacher differences were accounted for (Byrne, 2012).

First we specified a baseline multilevel model with four correlated latent factors at the within (individual) and between (class) level (Model 14). This model provided an adequate fit to the data (see Table 3 for model fit and Table 4 for parameter estimates). The residual variance for one between-teacher item ('Speaks clearly') was fixed to zero as the between-group variance was close to zero. At the within- and between-levels, all factor loadings were statistically significant. To test the equality of factor loadings across levels we constrained the factor loadings to be equal across the two levels (Byrne, 2012). This model (Model 15) provided a good fit to the data (see Table 3). Our findings indicate that the four latent factors solution provides a good fit to the data even accounting for potential effects of between teacher variance.

#### Test-retest reliability of the BESSI.

We first examined intra-rater reliability for each item by calculating Cohen's kappa ( $\kappa$ ) values for each binary-scored BESSI item. Mean  $\kappa$  values and ranges for each scale were .60,  $.29 \leq \kappa \leq .78$  for Behavioural Adjustment; .64,  $.43 \leq \kappa \leq .74$  for Language and Cognition; .53,  $.37 \leq \kappa \leq .68$  for Daily Living Skills and .71,  $.62 \leq \kappa \leq .80$  for Family Support. Next, we tested the fit of the four latent factor measurement model to the data at Time 1 (test) and

Time 2 (retest) using CFA and the WLSMV estimator in Mplus. The model showed a good fit to the data at Time 1, CFI = 0.94, TLI = 0.93, RMSEA = 0.05, and Time 2, CFI = 0.95, TLI = 0.95, RMSEA = 0.04. Each latent factor showed good internal consistency at both time-points. For Time 1 and Time 2 (respectively), Cronbach's alpha values were .86 and .88 for Behavioural Adjustment; .77 and .77 for Language and Cognition; .67 and .61 for Daily Living Skills and .69 and .67 for Family Support. The test-retest reliability of factor scale sum totals over the one month period was demonstrated by the following intra-class correlations: .81 for Behavioural Adjustment; .79 for Language and Cognition; .69 for Daily Living Skills and .92 for Family Support.

To assess the stability of the 4 latent factors of the BESSI across the one-month test-retest period, we then specified an 8 latent factor model in which each of 4 latent factors at Time 1 were correlated with each of the 4 latent factors at Time 2. We constrained factor loadings to be equal from Time 1 to Time 2 and allowed the residuals of each indicator at Time 1 to be correlated with its corresponding indicator at Time 2 to control for any item-specific systematic variance. This model fit the data well, CFI = .95, TLI = .95, RMSEA = 0.03. All the latent factor loadings, variances and covariances were significant, all  $p$ s < .01. Importantly, the latent factors showed strong one month test-retest reliability: Behavioural Adjustment,  $\phi = .91$ ,  $p < .001$ , Language and Cognition,  $\phi = .91$ ,  $p < .001$ , Daily Living Skills,  $\phi = .88$ ,  $p < .001$ , and Family Support,  $\phi = .98$ ,  $p < .001$ . The strong test-retest reliability shown in this sub-sample of 258 children enabled us to explore the findings from the full sample of 1456 children with reasonable confidence.

#### Family and Child Correlates of Problem Ratings on the BESSI

To examine the relations between child-level characteristics we specified a two-level structural model in which each of the four latent factors were regressed onto age and

dichotomous variables representing gender, ethnicity, free school meal status and presence of an older sibling at the individual level only. Figure 2 (Panel A) shows a simplified path diagram depicting only the significant paths at the individual level. The parameter estimates for this model provide information about the extent to which child-level characteristics account for individual differences in BESSI ratings when potential effects of between-teacher differences are taken into account. This first model (Figure 2, Panel A) provided a good fit to the data, CFI = 0.95, TLI = 0.94, RMSEA = 0.02. Behavioral Adjustment latent factor scores showed weak associations with gender (higher scores for boys) and family income (higher scores among children eligible for free school meals). Latent factor scores for Language and Cognition and for Daily Living Skills were moderately related to three predictors: age (fewer problems among older children); gender and family income (more problems among boys and children eligible for free school meals). Family Support latent factor scores were predicted by gender, family income and birth order, with greater problem scores shown by boys, children eligible for free school meals and children with older siblings.

Next we sought to examine the relations between Family Support latent factor scores and each of the three child-focused latent factors when age, gender, ethnicity, presence of an older sibling and free school meal status were taken into account. We specified a multilevel structural equation model in which the Behavioral Adjustment, Language and Cognition and Daily Living Skills latent factors were regressed onto the Family Support latent factor and each of the other predictors (Figure 2, Panel B) at the child-level only. This model provided a good fit to the data, CFI = 0.94, TLI = 0.94, RMSEA = 0.02. Higher problem ratings on the Family Support latent factor were strongly related to difficulties in Behavioral Adjustment, Language and Cognition and Daily Living Skills. Interestingly, when Family Support was added to the regression model as a predictor, the independent association between free school meal status and each of the three child-focused latent factors became non-significant. Gender

remained an independent weak to moderate predictor of ratings on each of the latent factors. Age continued to exert a moderate independent effect on Language and Cognition latent factor scores. Together the findings from these models support the construct validity of the BESSI.

## Discussion

The first goal of the current study was to construct a short questionnaire – the Brief Early Skills and Support Index (BESSI) - that could be used to identify young children in need of extra support during the transition to school or nursery, without adding a significant burden to teachers' heavy workloads. Confirming the success of this endeavour, each of the four BESSI subscales (i.e., Behavioral Adjustment, Language and Cognition, Daily Living Skills and Family Support) showed good internal consistency and good test-retest reliability across a one-month interval. In addition, the variability in scores for individual BESSI items confirmed their suitability for assessing children from toddlerhood to early school age. In this discussion we first consider how our results compare with other existing research, commenting on contrasts in the measures used that may explain between-study differences. Next, we highlight several potential applications of the BESSI in future research and in educational practice.

### How do our Findings Compare with Those from Other Studies?

Perhaps the most interesting findings to emerge from this study were the robust links between individual differences in teachers' ratings of family support (e.g., praise, attendance, punctuality, regularity of reading and talking about fun at home) and variation in each of the three BESSI child subscales. Moreover, family support ratings fully accounted for the lower scores on each outcome among children who were eligible for free school meals. At first glance, these results appear to contrast with findings from a nationally representative cohort

study in the United Kingdom - the Millennium Cohort Study (MCS). Results from the MCS indicate that the link between socio-economic status and academic achievement at age 7 is *not* explained by parenting behaviors (Hartas, 2015; Sullivan, Ketende, & Joshi, 2013). However, this apparent contrast in results may reflect methodological differences between the two studies. In particular, as well as involving a much bigger and more representative sample, the MCS included detailed measures of parental education and income that were not available in the current study. One obvious possibility is that the BESSI Family Support subscale captures the effects of these omitted variables. Our results therefore require replication within a study that includes wider and more detailed measures of socio-economic status than simple eligibility for free school meals (or pupil premium). Any causal conclusions also require direct testing, for example, within an intervention study. In addition, future research should investigate links between Family Support ratings and child outcomes beyond the transition to school: the oldest children in our study were just 5.5 years old, whereas those in the MCS were aged 7. This additional period of schooling may well attenuate the association between family support and child adjustment and development.

It is also worth noting that the MCS relied on parental self-report to assess family support, raising the possibility (noted by Hartas, 2015) that parental ratings of the warmth of their relationships with their children (indexed by three items focusing on the frequency of displays of affection, time spent listening and doing things with child and overall closeness of the relationship) were affected by demand characteristics. The difference between what parents say and what parents do is well recognized. In a review of the field, Zaslow et al. (2006) reported that direct observations of parenting yielded effect sizes that were twice as large as self-report measures. Thus our use of teachers as informants may have contributed to the between-study contrast in results. In addition, whereas the MCS analyses focused on academic outcomes and adopted a categorical approach in their analyses, our analyses

adopted continuous scales to index variation in Behavioral Adjustment, Language and Cognition and Daily Living Skills. This broader approach and adoption of continuous rather than categorical variables may also have contributed to the differing results from the two studies.

Note, however, that regardless of the extent to which methodological differences ‘explain’ the contrasting findings, our findings should not be used to recast problems of inequality as a matter of parental responsibility (Hartas, 2015). Other studies have also reported parenting as a key mediator of associations between poverty and poor child outcomes (e.g., Dodge, Pettit, & Bates, 1994), but evidence regarding mediators should not detract from efforts to reduce inequality in order to give all children a fair start in life. Our goal in constructing the BESSI was that it would help educational professionals support all children (regardless of family background) who display difficulties during the transition to school or nursery. In the remainder of this discussion we organize our points around features of the BESSI that may be valuable in this endeavour.

### The BESSI is a Useful Tool for Creating a Dialogue Between Research and Practice

One unexpected finding came from our initial comparisons of competing measurement models for the BESSI, which revealed a strong overlap between items selected to measure self-regulation (e.g., ‘has trouble sitting still’) *versus* social skills (e.g., ‘usually happy to share’). These items loaded together onto a single latent factor (i.e., Behavioral Adjustment), a finding that is open to two competing interpretations. One possibility is that among very young children there is such a close interplay between self-regulation and successful adjustment to the social demands of the classroom that these items are genuinely inextricably intertwined, even though they become more differentiated in older children. This proposal is akin to the view within neuropsychology that development is characterized

by a progressive modularization of cognitive functions (e.g., Karmiloff-Smith, 1998). Another possibility is that, to adopt a phrase from Shonkoff and Bales (2011), self-regulation in the early years represents a “cognitive hole”. That is, unlike research into language and linguistic environments, whose importance is widely recognized by teachers, research evidence highlighting the importance of early self-regulation has yet to be effectively disseminated beyond academic circles in the United Kingdom. Both in its brevity and through its use of everyday examples of self-regulation in young children, the BESSI provides a simple tool that may be valuable in establishing a dialogue between researchers, teachers and parents in order to communicate the importance of self-regulation for children’s long-term adjustment (McClelland, Acock, Piccinin, Rhea, & Stallings, 2013; Moffitt et al., 2011).

#### The BESSI Permits the Assessment of Family Influences on School Readiness

An important strength of the current study lies in its extension of the conceptual scope of existing measures through the assessment of family support as well as child skills. Underscoring the value of this approach, the elevated levels of problems among children from low-income families in our sample were explained by a group difference in family support, highlighting the need for family-based interventions. A related finding to emerge from the data on this subscale was that children with older siblings showed reduced family support (as indicated by higher ratings on this scale). This suggests that policy makers should recognize the additional challenges that come with caring for more than one child and develop intervention schemes that provide families with more sustained support. For example, nurseries and schools could provide parent-toddler groups for younger siblings. The BESSI could prove useful in evaluating the impact of this kind of intervention upon younger siblings’ school readiness. Likewise, future research might help to elucidate the diverse ways in which families support children’s transition to school. For example, Puccioni (2014)

showed that parental beliefs about school readiness predict gains in achievement and this effect was mediated by parental practices.

## The BESSI is Sensitive to Gender Contrasts in **Children's** Adjustment to Nursery and School

Strikingly, our findings revealed that boys were more likely than girls to display problems on 20 of the 30 BESSI items. To assess whether these contrasts might simply reflect an 'eye-of-the-beholder effect' we examined whether teachers' ratings for boys and girls showed measurement invariance. Our results showed no reduction in model fit when the factor structure, item loadings and the factor variances of the three child factors were constrained to equality for boys and girls, indicating that teachers were consistent in how they rated boys' and girls' behavior and ability. This demonstration of measurement invariance and significant gender contrasts in the child-focused factors of the BESSI indicates that young boys and girls show a genuine difference in their likelihood of experiencing problems in meeting the social, academic and practical demands of life at nursery or school. In addition, although gender differences on each of the three child latent factors of the BESSI remained significant when the effects of family support were controlled, it is worth noting that the data from our multi-level SEM (in which effects of between-teacher differences were controlled) showed that boys received less family support than girls, with a particularly clear gender difference for one item – 'talks about fun activities at home'. Interestingly, this item correlated with all the Language and Cognition items, mean  $r = .56$ , range = .46 to .61. In comparison, the item about reading at home showed more modest correlations, mean  $r = .35$ , range = .21 to .50 (see Table S1). The predictive utility of teachers' ratings of fun at home is an intriguing finding, which we are currently investigating through detailed video-based coding of parents' interactions with their pre-schoolers. Given that many parents lack confidence or interest in reading, the potential importance of family fun as a key ingredient



for school success may be valuable in engaging all parents in supporting their children's academic achievement.

## Limitations

A number of caveats also deserve note. In particular, it is not yet clear how well the BESSI works at an individual level. In particular, in a recent evaluation of the convergent and divergent validity of the EDI, Hymel, LeMare and McKee (2011) concluded that the EDI is more appropriate for deriving inferences at higher aggregate levels (e.g., community or region) than for drawing conclusions about individual children. One important future step is to establish whether BESSI ratings accord with more detailed assessments of individual children. That said, the brevity and relative simplicity of the BESSI (for which, unlike the EDI, all items are rated in the same way) may help achieve consistent results across different informants. Indeed our analyses adopted a multi-level approach, which accounted for rater effects. Note that given the wide age range in this sample these reflect differences both between teachers and between age groups. We are currently gathering new data in order to examine the sensitivity and specificity with which BESSI ratings allow one to identify children with special educational needs (SEN). This work will provide a first step towards evaluating the utility of the BESSI as an instrument for screening individual children.

Further work involving a greater number of children from ethnic minorities is also needed to assess family influences on children's adjustment and developing abilities more broadly. The ethnic homogeneity in the current study precluded detailed comparisons of school readiness among children from different ethnic backgrounds, yet previous research suggests variation in children's outcomes between different ethnic minority groups. In contrast with research findings from the USA, in which children from ethnic minorities are at increased risk of poverty (e.g., U. S. Census Bureau, 2011), recent studies of British children

indicate better adjustment and achievement among some minority groups – most notably British Indian children (Goodman, Patel, & Leon, 2010; Goodman, Patel, & Leon, 2008; Rotheron, 2007).

## Conclusions

In sum, this study contributes to the on-going debate about school readiness in several ways. First, from a cost-benefit perspective, the brevity and reliability (both internal consistency and test-retest stability) of the BESSI greatly enhances the feasibility of its use at a population level as a screen to facilitate efficient targeting of resources. Second, the BESSI appears to be developmentally appropriate across a relatively wide age range (from 2.5 to 5.5 years). Third, teacher ratings on the BESSI appear sensitive to contrasts between children from low-income families and their more affluent peers, not only in adjustment and ability but also family support. Fourth, to our knowledge, this is the first study to report reduced family support for young children with older siblings – a finding that deserves further investigation to ensure that all children receive the help they need in making a successful transition to school. Fifth, all four subscales of the BESSI show clear gender differences, providing a useful starting point for future longitudinal research to investigate the origins, persistence and outcomes of these gender differences in more detail. Together, these findings support the construct validity of the BESSI, in that the predictors of scores on each latent factor confirmed hypotheses motivated by the existing literature on school readiness. However, further work is needed to establish its suitability for other samples (e.g., children from diverse ethnic minorities) and for evaluating the effectiveness of pre-school interventions.

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Table 1. *Sample Characteristics*

	Total Sample	Nursery	Reception	2.50 – 3.49 Years	3.50 – 4.49 Years	4.50 – 5.50 Years
Mean Age in Years (SD)	4.27 (.64)	3.69 (.42)	4.75 (.29)	3.23 (.22)	4.03 (.30)	4.88 (.22)
% Male ( <i>M</i> )	49.2 (717)	48.4 (314)	49.9 (403)	47.6 (101)	49.3 (307)	49.8 (309)
% Female ( <i>M</i> )	50.8 (739)	51.6 (335)	50.1 (404)	52.4 (111)	50.7 (316)	50.2 (312)
% White British ( <i>M</i> )	88.7 (1279)	79.4 (519)	96.4 (760)	84.5 (180)	82.4 (514)	96.7 (585)
% Children with Older Siblings ( <i>M</i> )	56.5 (813)	60.8 (388)	53.1 (425)	43.8 (91)	41.1 (253)	45.8 (281)
% Eligible for Free School Meals ( <i>M</i> )	24.5 (300)	24.7 (108)	24.4 (192)	20.7 (29)	25.2 (120)	24.9 (151)
% Special Educational Needs ( <i>M</i> )	5.6 (79)	4.8 (30)	6.2 (49)	5.3 (11)	5.8 (35)	5.4 (33)

Running Head: BRIEF EARLY SKILLS AND SUPPORT INDEX

Table 2. *Descriptive Statistics*

Subscale	Item	<i>M</i> ( <i>SD</i> )	% Sample in the 'Problem' Category							
			Whole	2.50 – 3.49	3.50 – 4.49	4.50 – 5.50	Girls	Boys	No FSM	FSM
Behavior	Good at waiting patiently (N=1472) <sup>b</sup>	2.07 (.82)	24.7	30.7	23.0	24.3	18.2	31.4	23.1	29.7
Adjustment	Good at calming down (N=1471) <sup>b</sup>	1.99 (.66)	14.8	15.8	15.1	14.2	10.7	19.1	13.8	19.4
	*Easily distracted (N=1471) <sup>b,c</sup>	2.47 (.86)	46.8	56.5	45.3	44.9	37.8	56.0	43.0	56.7
	*Easily frustrated (N=1466) <sup>b</sup>	2.16 (.72)	26.7	30.4	25.5	26.7	19.2	34.6	26.0	35.1
	*Grabs others' belongings (N=1476) <sup>b</sup>	1.89 (.69)	14.8	18.3	15.1	13.2	10.1	19.6	13.4	19.4
	*Often interrupts (N=1466)	2.16 (.80)	27.5	23.2	26.2	30.3	23.7	31.4	25.4	34.4
	Can play with lots of children (N=1473) <sup>b</sup>	1.92 (.75)	17.9	18.1	17.0	18.8	13.5	22.6	17.8	23.0
	Usually happy to share (N=1466) <sup>b</sup>	1.93 (.69)	14.5	18.2	14.0	13.8	9.3	20.0	13.5	20.0
	Respectful towards adults (N=1466) <sup>c</sup>	1.78 (.58)	6.4	7.5	6.9	5.5	4.6	8.3	5.1	11.1
	*Has temper tantrums (N=1473) <sup>c</sup>	1.96 (.73)	18.6	19.9	18.4	18.4	15.4	21.8	16.9	27.3
	*Responds poorly to reprimands (N=1473) <sup>b,c</sup>	1.93 (.73)	16.8	20.4	16.1	16.3	12.5	21.1	14.5	24.4
*Has trouble sitting still (N=1463) <sup>b,c</sup>	2.27 (.86)	34.9	39.0	33.3	35.0	25.4	44.5	31.8	44.3	
Language & Cognition	Speaks clearly (N=1472) <sup>b,c</sup>	2.00 (.83)	23.2	29.3	23.0	21.3	17.1	29.7	19.1	36.3
	Enjoys identifying letters (N=1468) <sup>a,b,c</sup>	2.09 (.77)	28.2	53.3	30.5	17.2	21.7	34.9	22.1	36.0
Cognition	Understands wh-questions (N=1469) <sup>b,c</sup>	1.98 (.75)	20.1	23.4	21.6	17.6	16.0	24.5	15.2	34.8
	Can recognise his/her name (N=1466) <sup>a,b,c</sup>	1.88 (.79)	19.3	47.2	20.7	8.2	14.8	23.8	12.3	29.7
	Uses 1-to-1 correspondence (N=1464) <sup>a,c</sup>	1.92 (.77)	19.2	38.9	20.4	11.3	16.2	22.2	13.6	29.0
	Enjoys songs and rhymes (N=1468) <sup>b</sup>	1.64 (.59)	5	3.8	4.9	5.5	1.2	9.0	4.8	5.7
Family Support	Receives praise (N=1468) <sup>c</sup>	1.72 (.59)	6.3	3.2	7.2	6.5	5.6	7.0	3.6	16.2
	Always punctual (N=1456) <sup>c</sup>	1.81 (.73)	13.7	12.9	16.0	11.6	13.8	13.7	8.3	29.1
	Rarely misses a day (N=1473) <sup>a,c</sup>	1.77 (.73)	11.7	10.2	17.0	6.8	11.4	12.0	7.6	23.3
	Talks about fun at home (N=1469) <sup>b,c</sup>	2.07 (.73)	25.9	30.7	25.1	25.2	20.8	31.4	20.3	46.5
	Regularly reads at home (N=1306) <sup>c</sup>	2.02 (.73)	20.9	20.4	21.5	20.5	19.8	22.2	13.8	45.3
*Often appears sleepy (N=1471) <sup>c</sup>	2.01 (.67)	18.6	14.4	19.1	19.5	16.5	20.8	15.8	27.7	
Daily Living Skills	Able to work independently (N=1473) <sup>b,c</sup>	2.08 (.78)	25.8	30.1	26.1	24.0	17.3	34.7	23.8	33.3
Skills	Careful using scissors (N=1464) <sup>b,c</sup>	1.92 (.63)	13	18.8	12.7	11.5	7.5	18.8	10.6	20.1
	Does not need help with fork (N=1388) <sup>c</sup>	1.87 (.63)	10.7	7.9	12.3	10.0	8.5	13.1	9.0	17.6
	Fully toilet trained (N=1466) <sup>a,b</sup>	1.64 (.67)	7.2	18.0	6.9	3.7	4.9	9.7	5.2	9.0
*Appears aimless (N=1468) <sup>b</sup>	2.04 (.72)	22.1	21.0	21.6	23.0	18.2	26.3	21.3	26.0	

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*Needs help with belongings (N=1466) <sup>a,b</sup>	2.18 (.75)	29.9	41.0	27.5	28.5	20.2	40.4	29.3	36.7
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*Note.* \*Reverse Scored. <sup>a</sup> Significant age-related difference. <sup>b</sup> Significant gender difference. <sup>c</sup> Significant FSM difference.  $\alpha = .0016$ .





Table 3. *Fit Indices for Measurement Models*

Model	Description	CFI	TLI	RMSEA [90% CI]	$\Delta\chi^2$ (df)
<u>Whole Sample</u>					
1	One latent factor	0.88	0.88	0.07 [0.07, 0.08]	-
2	Two latent factors	0.90	0.89	0.06 [0.06, 0.07]	-
3	Three latent factors	0.95	0.94	0.05 [0.04, 0.05]	-
4	Four latent factors	0.95	0.95	0.05 [0.04, 0.05]	-
5	Five latent factors	0.95	0.95	0.05 [0.04, 0.05]	-
<u>Multiple-Groups CFA</u>					
<i>Measurement Invariance: Gender</i>					
6	Equal form, loadings & thresholds	0.96	0.95	0.04 [0.04, 0.05]	-
7	Equal factor variance: Behavior Adjustment	0.96	0.95	0.04 [0.04, 0.05]	0.03 (1)
8	Equal factor variance: Behavior Adjustment, Language & Cognition	0.96	0.95	0.04 [0.03, 0.04]	4.19 (1)
9	Equal factor variance: Behavior Adjustment, Language & Cognition, Daily Living Skills	0.96	0.95	0.04 [0.03, 0.04]	0.88 (1)
10	Equal factor variance: Behavior Adjustment, Language & Cognition, Daily Living Skills, Family Support	0.96	0.95	0.04 [0.03, 0.04]	12.49* (1)
11	Equal latent means: Behavior Adjustment	0.95	0.94	0.05 [0.04, 0.05]	61.09* (1)
12	Equal latent means: Language & Cognition	0.95	0.95	0.04 [0.04, 0.05]	38.02* (1)
13	Equal latent means: Daily Living Skills	0.95	0.95	0.04 [0.04, 0.05]	55.40* (1)
<u>Multilevel CFA</u>					
14	Four factors, two levels, factor loadings freely estimated	0.94	0.93	0.03	-
15	Four factors, two levels, factor loadings equal across levels	0.95	0.95	0.02	-

Table 4. Unstandardized and Standardized Parameter Estimates for Multi-Level CFA (Loadings freely estimated across levels)

Latent Factor	Questionnaire Item	Single Level				ICC	Within			Between		
		Est.	SE	Std.	ICC		Est.	SE	Std.	Est.	SE	Std.
Behavior	Good at waiting patiently	1.00	-	.89	.12	1.00	-	.91	1.00	-	.93	
Adjustment	Good at calming down	1.02	0.03	.90	.17	0.57	0.05	.79	0.70	0.15	.81	
	*Easily distracted	0.91	0.03	.81	.13	0.99	0.12	.91	0.81	0.22	.74	
	*Easily frustrated	0.85	0.03	.76	.26	0.54	0.05	.77	0.74	0.18	.67	
	*Grabs others' belongings	0.94	0.03	.84	.17	0.70	0.08	.84	0.75	0.15	.76	
	*Often interrupts	0.91	0.03	.81	.26	0.65	0.07	.82	0.97	0.21	.80	
	Can play with lots of children	0.76	0.03	.68	.35	0.39	0.04	.65	0.89	0.21	.78	
	Usually happy to share	0.97	0.03	.86	.23	0.82	0.10	.88	1.06	0.23	.79	
	Respectful towards adults	0.89	0.03	.79	.18	0.63	0.08	.81	0.57	0.20	.61	
	*Has temper tantrums	0.91	0.03	.81	.21	0.60	0.06	.80	0.81	0.16	.80	
	*Responds poorly to reprimands	0.95	0.03	.84	.17	0.70	0.06	.84	0.74	0.15	.73	
	*Has trouble sitting still	0.98	0.03	.87	.11	0.87	0.09	.89	0.77	0.18	.84	
	Language & Cognition	Speaks clearly	1.00	-	.81	.14	1.00	-	.78	1.00	-	1.00
Enjoys identifying letters		0.98	0.04	.79	.44	1.23	0.15	.84	1.67	0.40	.70	
Understands wh-questions		1.09	0.04	.88	.34	1.41	0.17	.87	2.05	0.40	.96	
Can recognise his/her name		0.91	0.04	.74	.47	1.29	0.18	.85	1.24	0.44	.47	
Uses 1-to-1 correspondence		0.95	0.04	.77	.39	0.94	0.12	.77	1.31	0.35	.72	
Family Support	Enjoys songs and rhymes	0.88	0.06	.72	.40	0.96	0.16	.77	1.24	0.49	.67	
	Receives praise	1.00	-	.75	.33	1.00	-	.77	1.00	-	.67	
	Always punctual	0.78	0.07	.89	.16	0.61	0.12	.59	0.42	0.16	.58	
	Rarely misses a day	0.79	0.07	.60	.25	0.57	0.12	.56	0.60	0.24	.66	
	Talks about fun at home	1.22	0.08	.92	.30	2.23	0.95	.94	2.04	1.02	.79	
	Regularly reads at home	1.01	0.07	.76	.37	1.00	0.20	.77	1.16	0.38	.71	
Daily Living Skills	*Often appears sleepy	0.89	0.07	.67	.20	0.71	0.14	.65	0.69	0.24	.78	
	Able to work independently	1.00	-	.88	.22	1.00	-	.91	1.00	-	.72	
	Careful using scissors	0.92	0.03	.80	.42	0.80	0.11	.87	1.37	0.32	.72	
	Does not need help with fork	0.61	0.05	.53	.46	0.40	0.06	.66	0.60	0.24	.46	
	Fully toilet trained	0.65	0.05	.57	.25	0.28	0.05	.53	0.47	0.15	.64	
	*Appears aimless	0.67	0.04	.59	.21	0.39	0.05	.66	0.28	0.10	.38	
	*Needs help with belongings	0.87	0.03	.76	.27	0.57	0.08	.79	0.63	0.18	.60	

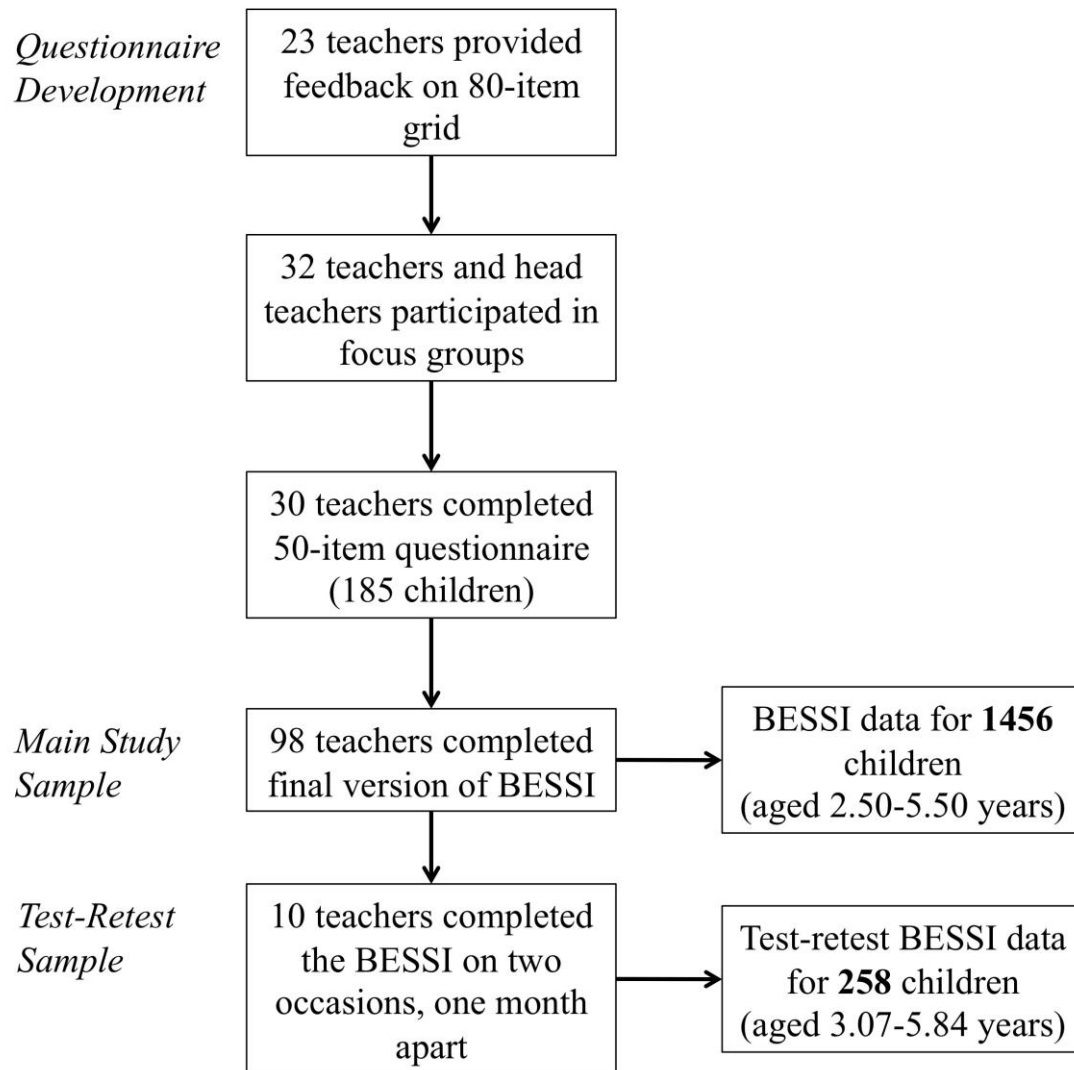


Figure 1. Study procedures for developing and validating the BESSI.

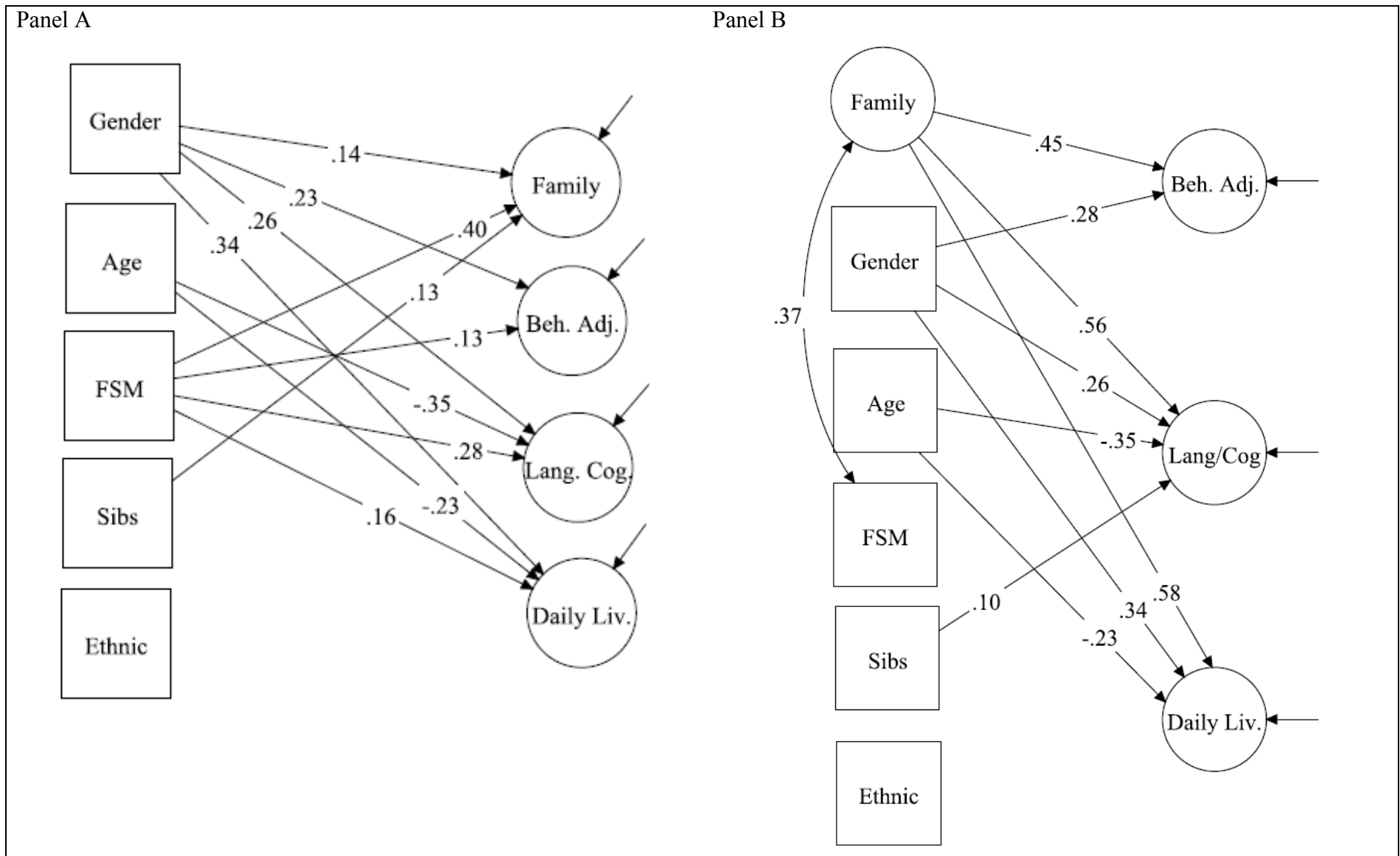


Figure 2. Panel A: Correlates of ratings on the four factors of the BESSI. Panel B: Correlates of ratings on three child factors of the BESSI.

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Supplementary Material:

Table S1. *Tetrachoric Correlation Matrix (Within-Level Correlations below Diagonal/Between Level Correlations above Diagonal)*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1 Waits	-	.76	.56	.54	.71	.80	.77	.76	.54	.59	.73	.64	.80	.50	.67	.22	.40	.61	.59	.51	.52	.54	.44	.72	.55	.52	.42	.55	.43	.47
2 Calm	.72	-	.64	.53	.68	.63	.62	.61	.54	.70	.80	.59	.68	.44	.65	.24	.33	.45	.57	.24	.28	.47	.47	.59	.42	.54	.26	.44	.31	.37
3 Distracted	.79	.57	-	.56	.58	.60	.44	.41	.07	.53	.53	.74	.57	.41	.49	.24	.36	.49	.39	.44	.41	.53	.60	.55	.69	.41	.10	.45	.32	.40
4 Frustrated	.67	.68	.66	-	.43	.60	.55	.51	.33	.60	.53	.65	.32	.29	.36	.20	.24	.34	.21	.21	.40	.37	.44	.48	.56	.42	.38	.37	.36	.60
5 Grabs	.78	.67	.67	.59	-	.65	.55	.76	.40	.80	.85	.40	.63	.26	.46	.13	.23	.18	.45	.36	.51	.35	.34	.47	.59	.42	.42	.60	.24	.47
6 Interrupts	.85	.62	.69	.57	.76	-	.62	.55	.47	.62	.63	.76	.60	.19	.53	.02	.21	.40	.57	.46	.49	.32	.50	.83	.45	.45	.44	.24	.68	.43
7 Plays	.37	.48	.47	.47	.47	.27	-	.74	.67	.59	.60	.66	.55	.46	.46	.19	.36	.44	.51	.11	.32	.60	.32	.42	.56	.55	.32	.44	.28	.50
8 Shares	.84	.68	.66	.65	.81	.72	.59	-	.79	.60	.66	.47	.64	.48	.53	.27	.53	.29	.51	.27	.48	.45	.29	.32	.47	.58	.38	.57	.19	.47
9 Respectful	.72	.72	.69	.57	.65	.78	.44	.74	-	.53	.69	.46	.69	.35	.56	.34	.30	-.07	.30	.00	.29	.58	.26	.27	.27	.48	.15	.38	.16	.36
10 Tantrums	.72	.84	.56	.69	.66	.64	.33	.68	.62	-	.72	.59	.58	.31	.54	.19	.36	.34	.43	.20	.47	.47	.35	.59	.50	.57	.19	.52	.44	.59
11 Reprimands	.75	.79	.60	.73	.70	.76	.40	.77	.81	.82	-	.61	.51	.24	.52	.27	.15	.17	.44	.36	.46	.33	.39	.46	.32	.38	.36	.43	.36	.28
12 Sitting Still	.81	.58	.86	.62	.73	.75	.37	.71	.66	.57	.65	-	.54	.53	.46	.17	.32	.57	.60	.50	.46	.59	.71	.72	.54	.49	.29	.32	.51	.54
13 Speaks	.28	.22	.50	.40	.36	.21	.52	.36	.26	.33	.27	.45	-	.52	.89	.47	.69	.60	.61	.61	.55	.88	.61	.68	.63	.57	.54	.61	.43	.52
14 Letters	.44	.25	.67	.45	.30	.29	.39	.44	.39	.35	.34	.54	.59	-	.50	.55	.74	.52	.36	.38	.34	.61	.39	.34	.58	.57	.04	.76	.07	.46
15 Wh-question	.45	.24	.56	.43	.41	.30	.56	.43	.33	.33	.27	.48	.79	.62	-	.53	.61	.73	.59	.73	.74	.68	.64	.66	.42	.67	.52	.64	.20	.38
16 Name	.47	.28	.60	.37	.43	.37	.35	.39	.32	.33	.35	.48	.61	.72	.72	-	.73	.28	.01	.46	.45	.40	.35	.10	.22	.35	.16	.69	-.08	.12
17 Counting	.39	.25	.46	.41	.32	.23	.33	.33	.24	.24	.34	.46	.58	.69	.66	.73	-	.58	.28	.49	.51	.64	.35	.42	.56	.63	.19	.72	.15	.30
18 Songs	.33	.40	.53	.63	.37	.27	.58	.47	.48	.41	.39	.47	.53	.55	.44	.63	.39	-	.52	.16	.08	.56	.44	.62	.53	.47	.20	.34	.25	.20
19 Praise	.32	.26	.37	.23	.49	.21	.39	.38	.57	.29	.29	.33	.20	.34	.29	.30	.33	.33	-	.49	.32	.61	.62	.51	.47	.47	.47	.19	.09	.30
20 Punctual	.13	.12	.29	.08	.29	.17	.15	.26	.32	.20	.18	.26	.22	.26	.23	.23	.32	.23	.57	-	.91	.35	.49	.43	.36	.34	.58	.23	.23	.19
21 Attendance	.13	.02	.23	.13	.17	.17	.19	.13	.23	.09	.14	.19	.22	.36	.25	.24	.32	.16	.37	.67	-	.40	.51	.41	.50	.39	.50	.47	.10	.37
22 Fun	.25	.28	.43	.31	.39	.19	.55	.44	.34	.31	.35	.40	.60	.56	.61	.52	.46	.61	.69	.35	.36	-	.66	.63	.65	.59	.27	.53	.18	.49
23 Reads	.23	.19	.39	.16	.32	.21	.24	.23	.29	.28	.23	.34	.28	.47	.42	.50	.46	.21	.73	.64	.51	.61	-	.48	.48	.57	.30	.31	.39	.45
24 Sleepy	.09	.20	.40	.32	.30	.12	.40	.28	.19	.23	.22	.28	.35	.37	.27	.28	.33	.42	.59	.44	.37	.49	.40	-	.48	.57	.43	.25	.59	.53
25 Works	.65	.52	.72	.60	.55	.48	.67	.60	.43	.44	.043	.65	.61	.72	.74	.71	.64	.63	.37	.15	.18	.59	.50	.36	-	.48	.31	.36	.27	.59
26 Scissors	.67	.51	.67	.47	.64	.61	.60	.64	.48	.49	.49	.69	.61	.52	.66	.70	.52	.51	.32	.21	.33	.53	.41	.33	.76	-	.34	.67	.24	.49
27 Cutlery	.38	.34	.36	.46	.38	.29	.57	.37	.35	.47	.22	.29	.62	.42	.69	.54	.47	.55	.26	.20	.24	.46	.36	.26	.61	.64	-	.18	.14	.35
28 Toileting	.28	.20	.32	.29	.34	.31	.43	.30	.34	.23	.33	.22	.45	.39	.45	.49	.41	.40	.22	.09	.28	.38	.27	.19	.46	.52	.48	-	-.03	.49
29 Aimless	.34	.29	.49	.33	.27	.25	.63	.28	.23	.28	.29	.45	.47	.57	.55	.50	.51	.50	.27	.09	.24	.53	.29	.45	.69	.58	.39	.29	-	.11
30 Belongings	.65	.43	.74	.53	.61	.58	.36	.53	.46	.44	.48	.66	.49	.46	.52	.57	.45	.58	.22	.14	.21	.35	.33	.34	.68	.67	.37	.42	.53	-