Family support and gains in school readiness

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Family Support and Gains in School Readiness: A Longitudinal Study

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Abstract

Background: Traditional measures of school readiness are labor-intensive and do not assess family support.

Aims: The current study used the newly-developed Brief Early Skills and Support Index (BESSI: Hughes, Daly, Foley, White and Devine 2015) to examine 6-month longitudinal stability and change in teachers' ratings of young children's school readiness and investigate the role of family support as a predictor of school readiness.

Sample: 578 children (270 boys; 74.2% White British) were included at Time 1 aged 2.58 to 5.84 years (M age = 3.98 years, SD = 0.66).

Method: Teachers and nursery workers completed BESSI questionnaires for each participant on two occasions separated by 6 months.

Results: The four latent factors of the BESSI (i.e., Behavioral Adjustment, Language and Cognition, Daily Living Skills and Family Support) exhibited longitudinal measurement invariance and individual differences in ratings on each factor showed strong stability over time. BESSI ratings were also sensitive to improvements over time. Auto-regressive models showed that family support and family income (as measured by eligibility for pupil premium support) at Time 1 each uniquely predicted child outcomes at Time 2.

Conclusions: These findings highlight the importance of family contexts for children's school readiness.

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Family Support and Gains in School Readiness: A Longitudinal Study

What is 'school readiness' and how should it be measured? Traditional definitions hinge on children's formal skills (e.g., literacy, numeracy) but this perspective fails to capture the importance of children's capacities to regulate their thoughts, feelings and behaviors as predictors of long-term academic outcomes (e.g., McClelland et al., 2007). For many theorists, however, the term 'school readiness' is problematic in its suggestion that young children can reasonably be expected to be 'ready' for school, when clearly this responsibility should be shared between schools, families and communities (e.g., High et al., 2008). Historically, children's school readiness was assessed to determine whether there was a need for special educational provisions that could not be met by a mainstream school. However, more inclusive educational policies mean that school readiness is now assessed to establish what adjustments a school might make to meet a child's developmental needs. From this perspective, traditional assessments of specific cognitive abilities are both labour-intensive and provide an incomplete picture of children's school readiness.

Both theoretical and practical concerns therefore highlight the need for new measures that go beyond assessing early language and cognitive abilities to provide information about children's self-regulatory and social skills, their autonomy in daily life and the support that they receive at home. Existing measures such as the Early Development Inventory (Janus & Offord, 2007) offer a multi-dimensional approach to assessing school readiness but, as discussed elsewhere (Hughes et al., 2015) are open to at least three criticisms: (i) the overall length of the instrument (7 pages), (ii) a lack of developmental suitability for children under the age of 4, and (iii) a narrow focus on child characteristics such that effects of family support cannot be examined. Responding to this challenge Hughes, Daly, Foley, White and Devine (2015) developed a short (30-item) questionnaire, the Brief Early Skills and Support Index (BESSI), that is suitable for rating children across a relatively wide age range (2.5 to

5.5 years), and provides information about each of these diverse markers of school readiness. Ratings from teachers and nursery staff for approximately 1750 children demonstrated that BESSI scores showed good test-retest reliability and were sensitive to age, gender and income-related contrasts in children's school readiness. In addition, BESSI scores indicated robust associations between family support and each of three child markers of school readiness (adjustment, language/cognition and daily living skills). Although these findings suggest that the BESSI is a promising tool for evaluating age-related changes and individual differences in key markers of children's school readiness, the cross-sectional design of this study limits conclusions. Longitudinal data are needed to establish the psychometric properties of the BESSI regarding stability and change in the three child scales, and the developmental significance of family support as a predictor of child markers of school readiness. To address these twin aims (outlined below), BESSI ratings in the present study were gathered from teachers and nursery staff for 578 children at two time points spanning a school year, separated by approximately six months.

Stability and Change in Child Markers of School Readiness.

Even when striking in magnitude, individual differences are not always developmentally significant: children may catch up with each other such that early variation tells us very little about later outcomes. This point is well illustrated by the everyday example of early individual differences in walking and talking: while early variation in infants' language skills predicts later individual differences in vocabulary (Scarborough, 1990), the age at which children start to crawl or walk has much less predictive utility (Murray, Jones, Kuh, & Richards, 2007). An important step in establishing the BESSI's utility as a measure of school readiness is therefore to demonstrate that individual differences in BESSI subscale scores remain stable over time.

Equally, it is also useful to know whether the BESSI can be used to monitor *changes over time*. While questionnaire measures are quick and non-intrusive to administer, they do have common drawbacks. In particular, ratings that reflect global impressions formed over a period of time are likely to be relatively insensitive to change over time. Thus while Hughes et al. (2015) found clear contrasts between age groups in their study (2.5 to 3.5 years; 3.5 to 4.5 years and 4.5 to 5.5 years), it remains important to also assess whether the BESSI can be used to monitor change over time in individual children's school readiness.

A further question of interest for the current study concerned the extent to which, across the 6-month study period, children from low-income families (i.e., children eligible for pupil premium funding) caught up with their more affluent peers on each of the BESSI child markers of school readiness. The pupil premium grant was introduced in England in 2011 to support the education of disadvantaged children in state-funded primary and nursery schools (Jarrett, Long & Foster, 2016). This funding is provided to support children whose parents are in receipt of income support. Nationally around 25.4% of primary school pupils are eligible for pupil premium (DofE, 2016). Pupil premium status therefore provides a useful indicator of socio-economic disadvantage that is readily available to teaching staff. Whether or not disadvantaged children catch up with their more affluent peers is a question with clear importance for policymakers, in that a key societal benefit of early education lies in its power to reduce the income-related achievement gap between children (Duncan & Sojourner, 2013; Feinstein, 2003).

Family Support and Children's School Readiness.

As noted in the call for this special issue, educational policy places a strong emphasis on family support for children's learning at home, but the evidence for relations between parent involvement and academic achievement is actually rather equivocal (Sharp, Keys, & Benefield, 2001). With this in mind, the robust associations between family support and child

markers of school readiness reported by Hughes et al. (2015) deserve attention. Correlation is not causation and growing evidence for child-driven effects on parenting (Burke, Pardini, & Loeber, 2008) challenge simple conclusions regarding family influences on children's school readiness. As a result, longitudinal cross-lagged analyses of the relationships between family support and different markers of school readiness are needed.

Another difficulty for researchers is that effects of family environment on children's educational outcomes are likely to be non-linear. That is, in contrast with the substantial adverse effects of parental neglect or maltreatment, more normative variation in the quality of parent-child relationships on child outcomes appears to have a much weaker impact on children's development (e.g., Belsky & De Haan, 2011). Illustrating this nonlinearity, parents' social support and parenting style have each been reported to be significantly stronger predictors of preschoolers' prosocial behavior for mothers who were teenagers at the birth of their first child than for older mothers (Ensor & Hughes, 2010). In part, this nonlinearity may reflect a 'Matthew effect' (Bakermans-Kranenburg, Van Uzendoorn, & Bradley, 2005): buffering effects of non-parental sources of cognitive or emotional support may be more available to children from affluent families than to their less affluent peers. We therefore hypothesized that family support for children's school readiness would have greater developmental significance for children from low-income families than for their more affluent peers.

In summary this study was designed to address two sets of questions. The first set concerned the psychometric properties of the BESSI for tracking children's development over time. Here we first investigated the measurement invariance of teachers' responses at the two time-points. In other words, do teachers interpret the same items in the same way at both time points? Next we examined the stability of individual differences on each BESSI subscale over time. That is, is there rank-order stability in BESSI ratings over time? We also

investigated the extent to which the BESSI subscales were sensitive to change over the school year. That is can the BESSI subscales detect change in children's performance and support over a relatively short (6-month) period from Time 1 (i.e., the middle of the first term in the academic year) to Time 2 (i.e., middle of the final term in the academic year)? Our second set of questions concerned child and family predictors of change over time. Specifically, while controlling for Time 1 BESSI scores, we examined the unique effects of child factors (including age, gender, and ethnicity) and family factors (i.e., family financial disadvantage, family support and the presence of an older sibling) on Time 2 BESSI subscale ratings.

Method

Participants

At Time 1, 578 BESSI questionnaires were gathered from 39 teachers from 14 nurseries and primary schools in the Wirral, Norfolk, London, Derbyshire and Manchester, England. Schools in these areas were targeted to maximise economic and ethnic diversity. The children (270 boys) were aged between 2.58 and 5.84 years, M = 3.98 years, SD = 0.66. Specifically, 154 children were aged between 2.50 and 3.49 years (70 boys; 40.5%), M = 3.25 years, SD = 0.19, 289 children were aged between 3.50 and 4.49 years (142 boys; 49.1%), M = 3.91 years, SD = 0.25, and 133 children were aged between 4.50 years and 5.49 years (56 boys; 42.1%), M = 4.95 years, SD = 0.28. Two boys were aged between 5.50 years and 5.84 years. Excluding the two outliers (aged > 5.50 years), the proportion of boys and girls was similar across each age group, χ^2 (2) = 1.91, p = .39. At Time 2 (approximately six months later, M = 5.71 months, SD = 0.57, range: 4.56 – 7.08 months), teachers were again asked to use the BESSI to rate the same children: 568 questionnaires (98%) were returned, and the children (264 boys) were aged between 3.06 and 6.30 years, M = 4.46 years, SD = 0.64. The sample was ethnically diverse: 74.2% of the sample was White British, 5.4% was White European, 2.9% were Mixed Ethnicity, 4.5% was Asian British,11.1% were Black British,

and 1.9% was Chinese or another ethnic group. Twenty per cent of the sample was eligible for pupil premium (i.e., the children's parents were in receipt of state income support) and teachers reported that 6.5% of the sample had a statement of special educational needs. To put this in perspective, in England 25.4% of children in primary school are in receipt of pupil premium and 2.6% of children have a statement of special educational needs (DofE, 2016).

Measures

The Brief Early Skills and Support Index (BESSI). The BESSI (Hughes et al., 2015) is a 30-item teacher questionnaire with four subscales: Behavioral Adjustment (BA), Language and Cognition (LC), Daily Living Skills (DLS) and Family Support (FS). Teachers are asked to rate the degree to which they agree with each statement about the child on a four-point scale (from Strongly Agree to Strongly Disagree). Twelve items measure BA (e.g., 'Is easily distracted'), six items measure LC (e.g., 'Understands wh-questions'), six items measure DLS (e.g., 'Is fully toilet trained') and six items measure FS (e.g., 'Talks about fun, shared activities at home'). Items are scored on a binary scale (i.e., Strongly Agree and Agree responses, and Strongly Disagree and Disagree responses are collapsed), with high scores (1 point on each item) indicating the presence of a problem. This scoring procedure is consistent with the procedures used in previous studies (Hughes et al., 2015) and reflects the skewed distribution of responses to each item.

Procedure

The University of Cambridge Psychology Research Ethics Committee provided ethical approval for the procedures used in this study. Following the autumn half-term break (i.e., when staff had known children for 2 to 3 months) we sought consent from head teachers or nursery managers. Once this was obtained, teachers of Nursery and Reception classes, and staff in private day nurseries were sent parent information sheets to distribute to caregivers. Caregiver consent was not sought however caregivers were informed that their child's teacher

would be taking part in a study in which the teacher would provide non-identifying information about their child that would be kept strictly confidential. Caregivers who did not want information about their child to be included were asked to return a form to their child's teacher to withdraw their child from the study. Teachers provided written informed consent and indicated whether they were willing to complete the BESSI for all their students for whom they had consent, for half of their class (i.e., every other child on the register), or whether they were only willing to rate their key children (in the case of nursery settings). In offering this choice, our aim was to maximise teachers' participation. The second wave of questionnaires was sent just after the summer half-term break (i.e., after an interval of approximately 6 months). Gift vouchers for each class were sent at each time point as a token of thanks for teachers returning completed BESSI forms.

Analytic Strategy

We used latent variable modelling in *Mplus* Version 7 (Muthèn & Muthèn, 2012) to analyse the data. Since BESSI items were categorical we used a mean- and variance-adjusted weighted least squares estimator in each of our models (WLSMV) (Brown, 2015). We evaluated each model using Brown's (2015) recommended criteria: root mean error of approximation (RMSEA) ≤.08, comparative fit index (CFI) ≥.90, and Tucker Lewis index (TLI) ≥.90. We used a full information approach (in which missing model parameters and standard errors are estimated using all available data) to analyse the data so that all cases with data at Time 1 (N = 578) could be included in the analyses (Acock, 2005; Enders, 2001). We used confirmatory factor analysis (CFA) to test the fit of the previously establish four-factor model for the BESSI (Hughes et al., 2015) at Time 1 and Time 2. Next we examined the measurement invariance of this model and latent mean changes from Time 1 to Time 2 (Brown, 2015; Little, Card, Slegers, & Ledford, 2007). Finally, we examined the predictors of Time 2 scores on the BESSI using auto-regressive models in which we regressed each of

the BESSI latent factors at Time 2 onto the corresponding Time 1 latent factors to control for individual differences in latent factor stability (Newsom, 2015).

Results

Descriptive Statistics

Table 1 presents the descriptive statistics for each BESSI item at Time 1 and Time 2. At Time 1 item non-response occurred in fewer than 2% of cases for all items with two exceptions. Responses to the items 'Does not need help using a fork or spoon' and 'Regularly read to at home' were missing for 8.7% and for 9.9% of cases respectively. The same pattern was observed at Time 2. Responses to the items 'Does not need help using a fork or spoon' and 'Regularly read to at home' were missing for 8% and 14.7% of cases respectively. To investigate item non-response in these domains we conducted a four logistic regression analyses in which we regressed a dummy variable for item non-response in for each item at Time 1 and Time 2 onto age, gender, pupil premium status, ethnicity, presence of an older sibling, teacher qualification status and the other 29 BESSI items. At Time 1 and Time 2 none of the predictor variables was significantly related to item non-response for the 'Fork or Spoon' item. For the 'Reading at Home' item at Time 1 teacher qualification status was the only predictor of item non-response, B = -4.41, SE = 1.56, $Wald$ (1) = 8.02, p = .005, with unqualified teachers being more likely to have item non-response. At Time 2, age, B = -3.41, SE = 1.02, $Wald$ (1) = 11.17, p = .001, teacher qualification status, B = -6.19, SE = 1.59, $Wald$ (1) = 15.03, $p < .001$, and eligibility for pupil premium status, B = 4.39, SE = 1.38, $Wald$ (1) = 10.17, p = .001, each predicted item non-response. That is, younger children, unqualified teachers and children eligible for pupil premium were more likely to have missing data on this item.

Longitudinal Measurement Invariance, Stability and Change

We first tested a four-factor model of the BESSI indicators whereby each indicator loaded onto one of four correlated latent factors representing individual differences in Behavioral Adjustment (BA), Language and Cognition (LC), Daily Living Skills (DLS) and Family Support (FS). This four factor model provided a good fit to the data at Time 1, CFI = 0.95, TLI = 0.95, RMSEA = 0.05, and at Time 2, CFI = 0.95, TLI = 0.95, RMSEA = 0.04. The standardized item loadings on each latent factor were all significant and each of the latent factors was strongly correlated within each time point. Next we examined the longitudinal measurement invariance of each of the four latent factors following procedures outlined by Brown (2015). In our baseline model we allowed each latent factor to correlate within and across time points. To account for item specific variance we correlated the residual terms from each item at Time 1 with the corresponding item at Time 2. We set the indicator loadings and thresholds at Time 1 to equality with their corresponding loadings and thresholds at Time 2. Inspection of the modification indices for this model indicated that the equality constraints for three item thresholds did not hold. We therefore removed these constraints from the model and used this revised model as the baseline (Model 1, Table 2). This model provided an acceptable fit to the data. Standardized and unstandardized item loadings for each latent factor are reported in Table S1.

Next we compared this baseline model with a strong factorial invariance model (corrected χ^2 difference test suitable for use with WLSMV) in which we constrained corresponding latent factor variances to equality over time (Models 2, 3, 4, 5) (Muthèn & Muthèn, 2012). These tests revealed that there were no significant changes in model fit between the baseline and invariance models (Table 2). From Model 5 we estimated the latent factor covariances for each of the four BESSI latent factors (Table 3). The standardized latent factor covariance estimates indicated that each of the four latent factors exhibited high levels of rank-order stability from Time 1 to Time 2.

Next, to investigate change in each of the latent factors from Time 1 to Time 2, we estimated the means for each latent factor. To do this, we set the thresholds of the lead indicators for each latent factor to 0 and freely estimated the latent mean values for each factor at Time 1 and Time 2 (Brown, 2015) (Table 2, Model 6). We compared the freely estimated model with a set of models in which corresponding means were constrained to be equal (Models 7, 8, 9, 10). Constraining each of the Time 1 latent means to equality with the corresponding Time 2 latent mean resulted in a significant degradation in model fit relative to the baseline model (Table 2, Model 6). This indicated that there were significant changes in each of the four BESSI latent means between Time 1 and Time 2. To estimate the magnitude of these changes, we set the latent factor mean for each of the Time 1 BESSI latent factors to 0 and estimated the standardized difference between the Time 1 and Time 2 latent means. There were decreases with a small effect size for BA, *Std. Est.* = -0.39, 95%CI [-0.47, -0.31], $p < .0001$, and medium effect size for the other BESSI latent factors, LC, *Std. Est.* = -0.64, 95%CI [-0.75, -0.54], $p < .0001$, DLS, *Std. Est.* = -0.63, 95%CI [-0.73, -0.54], $p < .0001$, and FS, *Std. Est.* = -0.57, 95%CI [.-0.67, -0.47], $p < .0001$.

The BESSI data were obtained from 39 different teachers each of whom rated a group of children, $M = 14.81$ children, $SD = 10.54$, Range: 1 – 51. Given the non-independence of the data, variance in ratings could have arisen due to both child-level variation (i.e., genuine individual differences between children) and teacher-level variation (i.e., differences between teachers in how they respond to different items) (Byrne, 2012). To examine the impact of the clustering of data, we calculated the proportion of variance in each item accounted for by between-teacher variance using intra-class correlations (ICCs) for each of the BESSI items (Muthèn, 1997). The ICCs ranged from 0 to .56. Since ICCs were >.10 for 49 items (Table S2), we specified a multilevel longitudinal CFA to examine the measurement invariance of the BESSI taking into account between-teacher variance (Byrne, 2012).

We first specified a baseline model with four correlated latent factors within and across time. As before, we permitted each item at Time 1 to correlate with the corresponding item at Time 2. This baseline model was specified at the within (individual) and between (teacher) level. The baseline model provided a good fit to the data, CFI = 0.96, TLI = 0.96, RMSEA = 0.01. Inspection of the between-level variances revealed that three items showed no between-level variance (i.e., 'Is respectful towards adults' at Time 1 and Time 2, 'Is fully toilet trained' at Time 2). We therefore set the between-level residual variances of these items to 0 in subsequent models (Table 2, Model 11).

Next, to test the equality of factor loadings across time, we constrained each Time 1 loading to be equal to each Time 2 loading across both levels (Table 2, Model 12). This model provided an acceptable fit to the data, CFI = 0.97, TLI = 0.97, RMSEA = 0.01. All within-level and between-level factor loadings were statistically significant (Table S3). Together these findings indicate that the longitudinal measurement invariance model provided a good fit to the data even when accounting for the potential effects of between-teacher variance. Importantly, this model revealed substantial rank-order stability in each of the latent factors between Time 1 and Time 2: BA, Std. Est. = .79, 95%CI [.75, .84], $p <$ .0001, LC, Std. Est. = .84, 95%CI [.76, .92], $p <$ .0001, DLS, Std. Est. = .93, 95%CI [.88, .98], $p <$ .0001, and FS, Std. Est. = .88, 95%CI [.79, .97], $p <$ .0001.

Child and Family Predictors of Problem Ratings on the BESSI

To examine the child and family predictors of BESSI ratings at Time 2 we specified an auto-regressive model in which each of the Time 2 latent factors was regressed onto the corresponding Time 1 latent factor to control for stability in each latent variable (Newsom, 2015). We permitted the Time 1 and Time 2 latent factors to correlate within each time point. As before we allowed each BESSI indicator at Time 1 to correlate with its corresponding value at Time 2 and constrained the item loadings and thresholds at Time 1 to be equal with

their corresponding values at Time 2. We regressed each of the Time 2 latent factors onto Time 1 FS, age at Time 2, gender (i.e., 0 = females and 1 = males), ethnicity (i.e., 1 = White British and 2 = Non White British), pupil premium status (i.e., 0 = not receiving and 1 = receiving) and family composition (i.e., whether (1) or not (0) the child had older siblings) to examine the unique effects of each of these child and family variables.

This model provided an acceptable fit to the data, CFI = 0.93, TLI = 0.93, RMSEA = 0.03. Table 4 shows the standardized and unstandardized longitudinal path estimates. The model accounted for substantial variance in each of the four Time 2 latent factors: BA, 64%, LC, 77%, DLS, 79%, and FS, 71%. With regard to child variables, age was significantly related to two of the four BESSI latent factors such that older children had significantly fewer problems in LC at Time 2 and in DLS at Time 2. Child gender was a significant predictor of all three child-focused BESSI latent factors, with boys more likely than girls to have problems at Time 2 in BA, LC and DLS. Ethnicity was unrelated to ratings on any of the BESSI latent factors at Time 2.

Each of the family variables in our model showed unique and specific associations with Time 2 latent factors. Time 1 FS predicted unique variation in both Time 2 LC and DLS but not BA. Children with more problems in FS at Time 1 were more likely to have problems with LC and DLS at Time 2 even when substantial stability in these variables was taken into account. Family income, as measured pupil premium status, was a significant predictor of FS and each of the child latent factors at Time 2. That is, children from poorer families were more likely to have problems in each of the domains measured by the BESSI at Time 2. Interestingly, children with an older sibling had significantly fewer problems in BA and DLS at Time 2 but did not differ from children without older siblings in LC or FS at Time 2.

We modified our auto-regressive model by adding in five latent variable multiplicative interaction terms to investigate the potential moderating roles of age, gender, ethnicity, pupil premium status and the presence of an older sibling on the relations between Time 1 FS and Time 2 BA, LC, and DLS. These latent variable interactions were estimated using a random effects model and a robust maximum likelihood estimator in *Mplus*. The unstandardized path estimates for this model are presented in Table 5. Note that, only two of the moderators were significant. First, the effect of FS on Time 2 BA was moderated by age. Specifically, the relation between FS and Time 2 BA was strongest in older children. Second, the effect of FS on Time 2 LC was moderated by ethnicity such that the relations between FS and LC were more pronounced among minority ethnic children.

Summary of Results

Our analyses revealed four key findings. First, the BESSI showed evidence of longitudinal measurement invariance across time. Second, while there was substantial rank-order stability in each latent factor from Time 1 to Time 2, there were moderate but significant decreases in problem ratings on each of the child latent factors from Time 1 to Time 2. Third, our longitudinal models revealed that both problems with family support and family poverty uniquely predicted individual differences in each of the three child latent factors at Time 2. Fourth, the relations between family support and each of the child latent factors at Time 2 were consistent across the children in our sample. However, the effect of family support on later language and cognition was strongest among minority ethnic children and the relations between family support and later behavioral adjustment was strongest among the oldest children in the sample.

Discussion

Teachers' Ratings of Children's School Readiness Show Both Predictive Utility and Sensitivity to Change

Replicating Hughes et al.'s (2015) results, our CFAs supported the construction of a family support factor and three child factors (i.e., Behavioral Adjustment, Language and Cognition, and Daily Living Skills). Moreover, multi-level modelling indicated that the BESSI exhibited measurement invariance across time points, enabling analyses of mean latent factor scores at each time point. That, is through adopting a multi-level longitudinal approach, we were able to account for potential between-teacher effects (e.g., teacher severity on particular items) thus isolating individual differences at the child level. In addition we were able to demonstrate that the effects of familiarity were negligible (i.e. teachers rated the same items in the same way at both time points). First, we examined whether initial ratings, made in October to December, when the teachers had known the children for less than three months, showed good predictive utility. Our results on this point were decisive: all cross-time associations in factor scores exceeded .70. Thus despite its brevity, the BESSI appears to be a useful instrument for identifying children who are likely to display persistent problems. Note that we permitted the error term for each item to correlate across time, such that the stability of our latent factors is unlikely to reflect item-specific stability (Brown, 2015). Second, we examined whether teachers' ratings on the BESSI were sensitive to improvements over time, by constraining mean problem scores for the latent factors to equality across time points and assessing changes in model fit. Having established longitudinal measurement invariance, it is unlikely that change in mean scores simply reflected changes over time in how teachers interpreted specific items (Brown, 2015). Instead, our results provide a clear and encouraging indication that the BESSI is sensitive to improvements over relatively short periods of time. Thus, although originally conceived as a screening instrument, the BESSI may also prove useful in evaluating interventions to foster children's school readiness.

Longitudinal Links Between Family Support and Child Outcomes

Our longitudinal design and ethnically diverse sample also allowed us to test the

generalizability of the strong concurrent associations between family support and child outcomes reported by Hughes et al. (2015). Our findings revealed that the associations between teachers' ratings of family support and child outcomes were generally universal. Only two moderating effects were noted: the effects of family support on later language and cognition skills were strongest among children from ethnic minorities and the relations between family support and later behavioral adjustment were strongest among the oldest children in the sample. This may reflect age-related improvements in children's self-regulatory skills, in that restless and inattentive behavior is developmentally normative in toddlerhood and may only indicate wider social problems amongst older children (Tremblay et al., 2004).

Our study was not genetically sensitive in design and so we cannot exclude the possibility that genetic factors underpinned the influence of family support on child outcomes. However, as argued by Asbury and Plomin (2014), genetic factors typically underpin stable characteristics while environmental factors typically contribute to change over time. By accounting for the very strong temporal stability in children's development and adjustment, our findings are therefore more readily interpreted as reflecting environmental than genetic influence. This conclusion is bolstered by the relatively specific across-time associations between family support and child outcomes, as Asbury and Plomin (2014) also noted that environmental effects are often domain specific, while genetic effects are typically domain general. Moreover, the associations between family support and child outcomes remained significant when child age, gender and pupil premium status were all included in the model, further strengthening the view that variation in family support is an important predictor of children's developmental progress.

The independent associations between family support and child outcomes also deserve note from a measurement perspective. Specifically, as the BESSI was designed for

teachers and nursery staff, the aim was to minimize the requirement for direct information about family life. While there was minimal missing data for five out of six of the Family Support items, approximately 10% of children received no rating for the item about reading at home. While the majority of children received ratings at both time points, non-response was associated with a lack of teaching qualifications, younger child age and eligibility for pupil premium. Without direct information (e.g., a parent-completed book diary), this item might not be suitable for younger children. Interestingly, although children from less affluent families showed higher average problem scores, associations between family support and child outcomes did not differ by family income. That is, the hypothesized 'Matthew effect' (in which children from more affluent families also enjoy more advantages outside the home, resulting in a weaker association between family support and child outcomes) was not supported. In this respect, our findings are at odds with the non-linear effects widely reported in the literature on parental influences on child outcomes and instead highlight the universality of associations between variation in family support and in children's language and cognition or daily living skills.

This similarity in results for children from affluent and less affluent families is in line with evidence gathered from the Effective Provision of Preschool Education project, which revealed a weaker than expected association between parental education and a parent measure of the home learning environment (e.g., reading, craft activities, library visits, play-dates) (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2004). In addition, the home learning environment was stronger than parental education as a predictor of children's literacy and mathematics skills at age 5 and 7 (Melhuish et al., 2008). That is, 7-year-olds from unsupportive home learning environments performed less well than would be expected from background measures, including parent education and social class. The researchers concluded that the findings highlight the importance of parental behavior rather than parental

education or income (Siraj-Blatchford, 2010). This could reflect a "cash-rich time-poor" effect, in which time as well as money or education constrains parental support. Our findings support this view, in that pupil premium status and teacher-rated family support each predicted unique variance in each of the BESSI child scales.

At the same time it is worth noting that the unique predictive relation between family income (as measured by pupil premium status) and later child problems suggests a widening gap for children from different backgrounds even across this relatively short 6-month period. This association is likely to be indirect. Factors such as financial strain and lower instrumental support are associated with poor mental health, which in turn may reduce maternal involvement and support (Jackson, Brooks-Gunn, Huang, & Glassman, 2000). Moreover, parents in crowded homes are less responsive to their children and this explains the association between crowded homes and poor cognitive function at age three (Evans et al., 2010). Thus factors associated with low income and educational attainment may hinder or buffer parental support, such that interventions may be most successful when they also target related socio-economic adversity.

Caveats and Conclusions

The brevity of the BESSI enabled the inclusion of a large and diverse sample but precluded any detailed measurement of family support. Adopting a richer approach involving micro-coding of the contingency of parent-child interactions, Hughes and Devine (2017) have recently documented the multifaceted nature of parental influences on children's cognitive development. Specifically, early negative and positive parent-child interactions each had unique effects on children's gains in executive function (but not vocabulary) over a 13-month period. Thus the broad approach provided by the BESSI does not shed light on underlying mechanisms and may be insensitive to moderation effects, such as differential effects of family influences at distinct developmental stages (e.g., Fearon et al., 2014;).

One useful direction for future work with the BESSI is therefore to evaluate how well teachers' ratings of family support compare with parent-reports and "gold-standard" video-based observations. A second goal is to establish whether other adults in a child's life, such as playgroup leaders, health visitors or social workers can provide valid BESSI ratings for children who do not access traditional educational settings (Young, 2015). In addition, it may be valuable to obtain BESSI ratings across shorter intervals of time, particularly for younger children. The 6-month approach adopted in the current study was designed to reflect changes within a school year and to minimize the burden upon educators. Finally, the universal applicability of the questionnaire also needs to be addressed. The BESSI is currently being translated into Spanish, setting the stage for research examining cultural contrasts in the nature and strength of family influences on children's early school success.

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Table 1. *Descriptive Statistics for BESSI Items at Time 1 and Time 2.*

		% 'Problem' Category	
Subscale	Item	Time 1	Time 2
Behavioral	Good at waiting patiently (N = 572/564)**	27.1	16.3
Adjustment	Good at calming down (N = 570/564)*	16.1	12.4
	^{R}Easily distracted (N = 572/566)*	44.1	39.4
	^{R}Easily frustrated (N = 564/565)**	22.3	16.6
	^{R}Grabs others' belongings (N = 567/568)**	14.8	9.9
	^{R}Often interrupts (N = 567/567)	22.8	21.2
	Can play with lots of children (N = 569/567)**	18.6	11.6
	Usually happy to share (N = 566/567)**	18.0	10.6
	Respectful towards adults (N = 566/567)	6.9	5.3
	^{R}Has temper tantrums (N = 573/566)**	16.9	12.2
	^{R}Response to reprimands (N = 570/565)	21.8	19.3
	^{R}Has trouble sitting still (N = 564/566)**	31.0	25.3
Language	Speaks clearly (N = 572/566)**	24.0	14.3
And	Enjoys identifying letters (N = 565/568)**	39.6	23.9
Cognition	Understands wh-questions (N = 578/568)**	22.6	12.5
	Can recognise his/her name (N = 567/567)**	25.9	9.3
	Uses 1-to-1 correspondence (N = 564/566)**	26.8	8.5
	Enjoys songs and rhymes (N = 568/568)	4.9	3.2
Daily Living	Able to work independently (N = 571/567)**	27.5	19.2
Skills	Careful using scissors (N =565/565)**	14.0	9.4
	Does not need help with fork (N = 528/532)	4.9	3.4
	Fully toilet trained (N = 567/567)**	7.9	4.2
	^{R}Appears aimless (N = 566/567)*	18.2	13.8
	^{R}Needs help with belongings (N = 565/565)**	26.9	16.8
Family	Receives praise (N = 570/565)	4.9	4.4
Support	Always punctual (N = 560/566)	15.4	13.1
	Rarely misses a day (N = 570/568)*	14.4	10.4
	Talks about fun at home (N = 568/566)**	30.5	18.9
	Regularly reads at home (N = 521/493)	20.5	19.3
	^{R}Often appears sleepy (N = 571/567)*	15.9	12.0

Note. N at Time 1 and Time 2 is reported for each item in parentheses. ^{R} Reverse scored item. $^{**}p < .01$, $^{*}p < .05$ for McNemar's Test.

Table 2. *Measurement Model Fit Indices*

Model		χ^2	*df*	$\Delta\chi^2$	Δdf	RMSEA	CFI	TLI
	Pooled Data Models: Longitudinal Invariance							
1	Equal Form, Equal Loadings, Equal Thresholds	2633.87	1705	-	-	0.03	0.95	0.95
2	Equal Factor Variances: Behavioral Adjustment	2625.79	1706	0.09^{ns}	1	0.03	0.95	0.95
3	Equal Factor Variances: Behavioral Adjustment, Language and Cognition	2627.65	1707	1.90^{ns}	2	0.03	0.95	0.95
4	Equal Factor Variances: Behavioral Adjustment, Language and Cognition, Daily Living Skills	2631.31	1708	4.62^{ns}	3	0.03	0.95	0.95
5	Equal Factor Variances: Behavioral Adjustment, Language and Cognition, Daily Living Skills, Family Support	2631.83	1709	6.64^{ns}	4	0.03	0.95	0.95
	Pooled Data Models: Latent Means							
6	Freely Estimated Means Model (Baseline)	2564.67	1706	-	-	0.03	0.95	0.95
7	Behavioral Adjustment Equal Means	2589.59	1707	34.13^{***}	1	0.03	0.95	0.95
8	Language and Cognition Equal Means	2593.32	1707	98.27^{***}	1	0.03	0.95	0.95
9	Daily Living Skills Equal Means	2582.31	1707	54.14^{***}	1	0.03	0.95	0.95
10	Family Support Equal Means	2574.35	1707	28.74^{***}	1	0.03	0.95	0.95
	Multilevel Models: Measurement Invariance							
11	Longitudinal Multilevel Model (Baseline)	3607.95	3307	-	-	0.01	0.96	0.96
12	Longitudinal Multilevel Model (Constraints)	3647.45	3391	-	-	0.01	0.97	0.97

Note. $^{***}p < .001$.

Table 3. *WLSMV Standardized Estimates for Latent Factor Covariances.*

		1	2	3	4	5	6	7	8
1	Behavioral Adjustment Time 1	-							
2	Language and Cognition Time 1	.58**	-						
3	Daily Living Skills Time 1	.83**	.90**	-					
4	Family Support Time 1	.53**	.79**	.77**	-				
5	Behavioral Adjustment Time 2	.77**	.40**	.68**	.46**	-			
6	Language and Cognition Time 2	.50**	.83**	.82**	.68**	.53**	-		
7	Daily Living Skills Time 2	.67**	.74**	.86**	.69**	.80**	.86**	-	
8	Family Support Time 2	.48**	.61**	.65**	.84**	.61**	.78**	.75**	-

Note. $^{**}p < .01$.

Table 4. *Unstandardized and Standardized WLSMV Path Estimates for Longitudinal Latent Variable Model*

Predictors	**Time 2 Behavioral Adjustment**			**Time 2 Language and Cognition**			**Time 2 Daily Living Skills**			**Time 2 Family Support**		
	Est.	SE	Std.	Est.	SE	Std.	Est.	SE	Std.	Est.	SE	Std.
Time 1 Scores	0.72	0.05	.68**	0.59	0.10	.55**	0.61	0.11	.59**	0.90	0.06	.77**
Age	0.002	0.08	.002	-0.33	0.08	-.28**	-0.16	0.08	-.11*	-0.15	0.09	-.09
Gender	0.45	0.09	.24**	0.36	0.09	.23**	0.49	0.11	.27**	0.03	0.12	.02
Ethnicity	-0.05	0.12	-.02	0.14	0.12	.08	0.19	0.13	.09	0.11	0.13	.05
Older Sibling	-0.30	0.10	-.16**	-0.03	0.09	-.02	-0.23	0.11	-.13*	0.07	0.13	.03
Pupil Premium	0.48	0.11	.17**	0.48	0.11	.25**	0.57	0.13	.26**	0.79	0.15	.31**
Family Support T1	0.08	0.06	.07	0.23	0.09	.26*	0.25	0.11	.24*	-	-	-
Variance Explained (R^2)	-	-	.64	-	-	.77	-	-	.79	-	-	.71

Note. $^{**}p < .01$. $^{*}p < .05$. Time 1 Scores = Corresponding Time 1 latent factor. Est. = Unstandardized Estimate. SE = Standard Error. Std. = Standardized Estimate.

Table 5. *Unstandardized Path Estimates (and Standard Errors) for Latent Factor Moderator Analyses*

Predictors	**Time 2 Behavioral Adjustment**	**Time 2 Language and Cognition**	**Time 2 Daily Living Skills**
Time 1 Scores	0.73 (0.07)**	0.76 (0.16)**	0.69 (0.13)**
Age	0.01 (0.15)	-0.29 (0.19)	0.07 (0.27)
Gender	0.41 (0.20)*	0.48 (0.27)	0.55 (0.33)
Ethnicity	-0.68 (0.29)*	-2.15 (0.67)**	-0.48 (0.42)
Older Sibling	-0.41 (0.20)*	-0.08 (0.24)	-0.33 (0.33)
Pupil Premium Status	-0.17 (0.27)	-0.09 (0.30)	-0.20 (0.40)
Family Support T1	-1.37 (0.53)**	-0.60 (0.37)	0.03 (0.53)
Family Support x Age	0.28 (0.11)*	0.06 (0.06)	-0.01 (0.10)
Family Support x Gender	0.01 (0.15)	-0.05 (0.07)	-0.04 (0.14)
Family Support x Ethnicity	0.30 (0.21)	0.41 (0.18)*	0.13 (0.14)
Family Support x Sibling	-0.25 (0.17)	-0.04 (0.08)	0.002 (0.14)
Family Support x FSM	0.15 (0.17)	0.01 (0.08)	0.03 (0.14)

Note. $^{**}p < .01$. $^{*}p < .05$. Time 1 Scores = Corresponding Time 1 latent factor.