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Measuring Parental Language to Target Families for Early-Intervention Services

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Abstract

Lack of expressive and receptive language skills can have a negative effect on a developing child if not identified and remedied early in the child's life. Current community and individual strategies to identify families with children who may need additional support are limited, and may not be sufficient to detect child language problems before they become entrenched. The present study explores the feasibility of using observed indices of *parental* language as a means of identifying families whose children are at risk of poor outcomes. Fifteen-minute speech samples taken from videotaped observations of 68 English speaking Welsh parent-toddler dyads interacting in the home during free-play were coded for 11 categories of parent language. Three complex measures were developed through factor analysis; parent prompts, encouraging and critical language. Two simple language indices (parent total words and total different words) were calculated for comparison. Two complex measures evidenced acceptable levels of inter-rater reliability, reasonable stability over time ($p < 0.05$) and some construct validity in terms of their association with socioeconomic disadvantage. 'Parent prompts' predicted toddler receptive and expressive language six months later ($p < 0.05$). In comparison the two simple measures were more reliable and stable over time and were just as strongly predictive of toddler language. The findings suggest that observed indices of parental language could prove useful in identifying high-risk families in need of specific support, such as parent training or other speech and language support, and the use of simple measures could be integrated into the assessment frameworks used by existing Early Years services. Further research is required to establish the feasibility of integrating such methods into current

service delivery and to establish the overall cost for Early Years services of incorporating this measure.

Approximately 7% of children in the United Kingdom (UK) begin mainstream education with some form of speech, language and communication needs (SLCN's) and whilst many will eventually catch up with their peers at least 50% will continue to experience problems into adulthood (Boyle, 2011; ICAN, 2006). Speech and language problems contribute to long-term poor academic outcomes in the domains of reading, literacy and mathematics (Boyle, 2011; ICAN, 2006; Roulstone, Law, Rush, Clegg & Peters, 2011), as well as affecting the development of other life skills such as social and emotional competency, behavioural regulation and positive mental wellbeing (Menting, van Lier & Koot, 2010; Roulstone et al., 2011). The significance of children's early language development in achieving positive long-term outcomes is now widely recognised by politicians and researchers (Bercow, 2008; Department for Education, 2014; HM Government, 2015), and the contribution of parenting behaviours during shared interaction on children's longer-term outcomes is now recognised.

In this article we explore the feasibility of using observed measures of *parental* language used with toddlers during free-play as a method for early years staff, such as Health Visitors or Children's Centre workers, to monitor children's language progress over the first two years of life in order to identify families whose children could benefit from specialised early support, such as parent training, to enhance language and communication skills within the family.

Parent Language and Child Language Outcomes

Language is acquired most effectively through shared supportive interactions with a more experienced speaker, such as a parent (Vygotsky, 1968) and the contribution of positive parenting styles on child outcomes is well documented. For example, warm and responsive parenting, combined with large quantities of speech that is grammatically diverse, predicts short-term positive child language outcomes (Fernald et al., 2014; Huttenlocher, Waterfall, Vasilyeva, Vevea & Hedges, 2010), later academic success (Hart & Risley, 1995), and good social and emotional development (Menting et al., 2010). Moreover, the manner in which parents use language to communicate with their children (i.e. to direct, to encourage) at 18, 30 and 36 months contributes 15-20% of the variance in children's language comprehension scores (understanding words) and vocabulary growth at 36 months (Barnett, Gustafsson, Deng, Mills-Koonce & Cox, 2012; Levikis, Reilly, Girolametto, Ukoimunne & Wake, 2015; Merz et al., 2014; Tamis-LeMonda, Kuchirko & Song, 2014). Conversely, parental language that prohibits children's verbalisations hinders later language and emotional development (Masur, Flynn & Eichorist, 2005; Mathis & Bierman, 2015; Taylor, Donovan, Miles & Leavitt, 2009).

Parental Language as a means of Identifying Families and Children

Emerging evidence suggests that observing parenting behaviours during parent-child interaction might offer a means for identifying very young children (under two years) at risk of poor language outcomes and families who would benefit from specialised family support in the early years (Down, Levickis, Hudson,

Nicholls & Wake, 2014; Hudson, Levickis, Down, Nicholls & Wake, 2014). Current methods of identification typically include the use of community level income data to target disadvantaged communities as a whole on the basis that these communities would have a greater proportion of children at risk of poor outcomes (Oberklaid, Baird, Bloar, Melhuish & Hall, 2013). Alternatively, local governments may utilise standardised developmental outcomes drawn from longitudinal monitoring of a child's progress over the first five years, as a means of identifying individual families and children who may need additional support. For example, the Ages and Stages Questionnaire (ASQ: Squires & Bricker, 2009) in the Early Years Foundation Stage in England (EYFS; Department for Education, 2014) or the Schedule of Growing Skills II (SGS II: Bellman, Lingman & Aukett, 1996) as part of the Flying Start (FS) Initiative in Wales (Welsh Government, 2011a). However, recent reports have highlighted the unreliability of indices of socioeconomic deprivation used at the community level to accurately identify the most high-risk families (Hutchings, Bywater, Griffiths, Williams & Baker-Henningham, 2013; Ipsos-Mori, 2009; Oberklaid et al., 2013), and further work is required to improve the identification of speech and language needs in younger children i.e. children under two, as part of current longitudinal monitoring frameworks (ICAN, 2011). In addition, there is increasing evidence that standardised language assessments developed for the under fives are affected by natural fluctuations in language during this period and are therefore unsuitable for screening and identifying children in the early stages of development (Dockrell & Marshall, 2014). Consequently, in order to successfully identify children younger than two for potential risk of poor language outcomes, professionals need to gather information

from other sources, such as the home environment, to establish the specific factors that predict risk of poor outcomes and where additional support might be beneficial (Roulstone et al., 2011). Measures of parental language might provide an alternative to current methods of identification, avoiding the unreliability of more traditional methods of identification whilst providing some form of formal assessment prior to the child's second birthday.

The Proposed Alternatives

Two common methods for measuring parental language with their children exist, a) measures of social communicative function (commands, questions and encouragements) and b) the overall quantity and quality of vocabulary used i.e. simple counts of the number of words and different words a parent uses with their child (Gridley, 2014). If such measures are to be used as part of routine assessments of children's progress across the early years there is a need to establish their achievable levels of reliability and validity and weigh this up against the time and cost associated with each approach.

A) *Measures of social communicative function* have demonstrated strong associations with indices of socioeconomic disadvantage such as income and maternal education (Hart & Risley, 1995: Lacroix, Pomerleau & Malcuit, 2002; Mertz et al., 2014). Moreover, such measures remain fairly stable over time (Barnett et al., 2012) suggesting their potential as an efficient and effective form of screening. However, coding schemes that incorporate measures of social communicative function can often be complex, require substantial training, need

video-tape technology, and are time consuming and costly. In addition, they can be greatly influenced by the specific setting i.e. free play versus structured interaction (Blacher, Baker & Kaladjian, 2013; Kwon, Bingham, Lewsader, Jeon & Elicker, 2013). As a result, there is a need to compare measures of social communicative function against other measures of parental language to establish whether they are the most effective and efficient way of identifying families who would benefit from specialised parenting support.

B) The alternative method for measuring parental language and identifying families who may be at risk has been to count *the number of words and/or the number of different words* parents use with children (Hart & Risley, 1992, 1995; Vigil, Hodges & Klee, 2005). Simple measures of parental language have been shown to be both strongly related to socioeconomic disadvantage, and more predictive of child language development over the first three years than complex measures composed using measures of social communicative function (Hart & Risley, 1995). Moreover, simple counts of parental language are generally more consistent over time (Rowe et al., 2012). In comparison to more sophisticated methods these simple measures require very little training and no specialist knowledge, providing researchers and assessors alike with a quick, reliable and potentially cost-effective method for assessing parental language during this critical period of development.

Current Study and Context

Very little research has directly compared different methods of coding parental language to establish which measure/measures are more superior in terms of achievable reliability and validity. The current study describes the development of a complex tool designed to measure observed parental language and compare its psychometric properties with two simple indices of language, total words and total different words using data drawn from a randomised controlled trial (RCT) of the Incredible Years Parent Toddler Programme (IYPTP; Webster-Stratton, 2011) implemented as part of the the FS initiative in Wales (Gridley, Hutchings & Baker-Henningham, 2013, 2015; Griffiths, Hutchings & Jones, 2011). FS was launched in 2007 as a direct response to the Welsh Governments Child Poverty Strategy (2011a) to eradicate child poverty in Wales by 2020 by providing universal early intervention services to the most high-risk families living in each of its 22 local authorities. During its initial launch FS areas were defined as primary school catchment areas in which a high proportion of children received free-school meals (45+%), and that also scored highly on the Welsh Index of Multiple Deprivation (WIMD: Welsh Government, 2011a and b). Families with children under the age of three, living within FS areas were eligible to receive extra health visitor visits, two and a half days free childcare each week for all children under the age of two, and had access to free language and play and parenting programmes.

The current study had five objectives:

1. Using exploratory factor analysis, to develop a complex coding scheme that reflects the most salient aspects of parental language used during interactions with preschool children in targeted socially disadvantaged FS areas in Wales.

2. Evaluate the scheme for its achievable levels of inter-rater agreement and stability over time.
3. Assess the construct validity of the scheme via its association with socioeconomic disadvantage.
4. Measure the scheme's predictive validity via its association with children's receptive (comprehension) and expressive (production) language skills six months later.
5. Compare the strength of the findings from the complex scheme with those obtained using two simple indices of parental language, total words and total different words.

It was hypothesised that the complex scheme would evidence good reliability and stability over time, in addition to good construct and predictive validity. However, based on previous evidence it was expected that total words and total different words would also evidence stability over time, strong associations with socioeconomic disadvantage and child language outcomes in the short term (Hart & Risley, 1995; Goldin-Meadow et al., 2014; Huttenlocher et al., 2010; Vigil, Hodges & Klee, 2005).

Method

Participants

Eighty-one parent-child dyads, who had previously participated in a RCT of the ITPTP (Gridley, Hutchings & Baker-Henningham, 2013, 2015; Griffiths, Hutchings & Jones, 2011), were assessed for eligibility for inclusion in the current study. Inclusion criteria specified that at the pre-intervention assessment dyads were living in a FS area in Wales, the child was aged between 10 and 36 months, the parent spoke English as their first language, and provided consent to being videotaped interacting with their children.

Pre-intervention data was available for 68 parent-child dyads, 46 dyads had been assigned to the intervention condition, whilst 22 had been assigned to the wait-list control condition. Randomisation had been conducted immediately following pre-intervention assessment using a two to one computer generated randomisation stratified for child age and gender. Parents/primary carers had a mean age of 28.93 years (*SD* = 6.52, range = 29) and were primarily mothers (*n* = 66/68). Children had a mean age of 21.37 months (*SD* = 6.59, range = 23) and 59% (*n* = 40) of the sample were boys whilst 41% were girls.

Post-intervention assessments were conducted at six-month follow up, approximately three months after the end of the intervention. Post-intervention data was only available for 55 dyads; 37 intervention and 18 control. Consequently, the child language data reported here relates to a smaller sample of 55 children consisting of 35 boys and 20 girls who were aged 21.38 months (*SD* = 6.69, range = 23).

Procedure

Demographic information, a child developmental assessment, and videotaped recordings of parent-child interactions, collected as part of a larger assessment battery for the RCT, were used for the current study.

For the main trial pre- and post-intervention assessments were conducted via two home visits conducted within one week of each other. At each time point the first visit lasted 90-minutes. Parents completed self-report measures of family health and demographics, parental stress (Abidin, 1995), depression (Beck, Steer & Brown, 1996), competence (Johnston & Mash, 1989), and mental wellbeing (Tennant et al., 2007). In addition, the researcher conducted a developmental assessment with the child. The second visit at each time point lasted approximately 60 minutes and included a measure of home stimulation (Bradley & Caldwell, 1979; Caldwell & Bradley, 2003), an independent evaluation of the quality of the family home (Dishion, Hogansen, Winter & Jabson, 2004) and a half-hour video recorded observation of the parent and child interacting during free-play.

Speech samples for parental language were derived from the final 15-minutes of each videotaped interaction based on previous research that has indicated that parents require at least 10-minutes to be accustomed to being observed (Gardner, 2000). Each video was hand transcribed to include both parent and child verbalisations. Measures of parental vocabulary, social communicative function and conversational turn were individually coded and calculated. Each transcript took approximately two hours to prepare prior to coding.

Measures

Parental language.

The final 15-minutes of each dyadic video at pre- and post-intervention assessments, was transcribed and coded using an adapted version of the scheme described by Hart and Risley (1995). In their original study transcripts of 60-minute averaged speech samples were coded according to 30 categories of language that represented the parents' use of vocabulary (word level), social communicative function (utterance level) and conversational turn (speaker level). For the present study each transcript was coded according to the descriptions of only 19 of these 30 categories (11 categories of social communicative function and eight categories of vocabulary). Total scores for both social communicative function and vocabulary categories were calculated by tallying their frequency across the 15-minutes of interaction.

Vocabulary.

Every word used by the parent during the 15-minutes of interaction was initially coded into one of four district categories of vocabulary using standard English dictionary definitions; nouns, verbs, modifiers (adjectives and adverbs) and functors (conjunctions and prepositions). All incidents where a parent introduced a new 'different' noun, verb, modifier or functor were also recorded separately resulting in eight categories of vocabulary.

Social Communicative Function.

Each parental utterance (defined as an uninterrupted chain of speech that begins and ends with a clear pause) was coded into one of 11 categories of social communicative function using video playback.

1. *Statement*. Any utterance directed at the child that was a factual statement relating to the parent, child or the environment. “That ball is blue”/ “It’s really windy outside today.”

2. *Wh-Question*. Any utterance that was a question directed at the child that began with either what, where, when, who, why or how. “Where is the missing puzzle piece?”/ “What does the doggy say?”

3. *Yes/No Question*. Any utterance that was a question that forced either a yes or no response from the child. “Is that good fun?”/ “Is that the red one?”

4. *Auxiliary Fronted Yes/No Question*. Any utterance that was a question that forced a yes or no response from the child that also begun with an auxiliary verb i.e. could, should, would, shall etc. “Could that block go on there?”/ “Shall I get your cars out?”

5. *Alternative Question*. Any utterance that was a question that asked the child to choose between two specified options. “Do you want to play with Fireman Sam or Bob the Builder?”

6. *Command*. Any utterance that made a request of the child or commanded them to do something. “Come here and play with Mummy”/ “Go and get your shoes.”

7. *Affirmative*. Any utterance that praised the child, or a product of the child. "Your picture is so pretty"/ "You're so clever,"

8. *Reflective*. Any utterance that repeated the child's preceding utterance. Child says "Big tower", parent responds, "Big tower."

9. *Expansion.* Any utterance that expanded upon the child's preceding utterance whilst maintaining its original content. Child says "Big tower", parent responds, "That is a big red tower."

10. *Prohibition*. Any utterance that was critical about the child or a product of the child. "You're so naughty"/ "That's cheeky."

11. *Prohibitory command*. Any utterance that commanded or requested the child to not do something. "Stop making so much noise"/ "Don't put that in your mouth."

Socio-economic disadvantage.

Health and demographic information for the caregiver, child and immediate family members was collected via a semi-structured interview using the Personal Data Health Questionnaire (PDHQ; Hutchings, 1996). Five questions relating to parental education and qualifications, employment status, marital status, family size and housing quality, were used to calculate level of socioeconomic disadvantage using the definitions set out below. For each definition participants were scored one for 'at risk' if they met the criterion, or a zero for no risk if they did not meet the criterion. Total risk scores ranged between zero and five.

1. *Primary caregiver education*. At risk parents had not obtained any post 16 basic leaving school qualifications, or, did not achieve qualifications beyond age 17 years.

2. *Marital status of primary caregiver*. At risk parents were single, unmarried, or had co-habited with their partner for less than two years.

3. *Family size*. At risk parents reported three or more children.

4. *Quality of housing*. This was assessed using two independent indices of overcrowding and housing standards. Combined scores for overcrowding and housing standards resulted in scores ranging between zero and two, with scores equal to or more than one considered indicative of parents at risk of poor quality housing.

    a. Overcrowding was based on specified bedroom standards (United Kingdom Housing Act, 1985). Houses that exceeded this margin were considered at risk of overcrowding and received a score of one.

    b. Housing standards were determined using four questions derived from the Coders Impression Inventory (CII; Dishion et al., 2004) relating to light, air, safety and cleanliness. Each item was scored as either unacceptable (scored one) or acceptable (scored zero) with scores ranging from zero to four. Families scoring equal to or above two using the CII were considered to be at risk of living in poor housing and were given a score of one.

5. *Employment status of primary caregiver*. At risk parents were defined as not employed either part-or full-time and/or whose sole income was from benefits.

Child language.

Schedule of growing skills II (SGS II; Bellman, Lingam & Aukett, 1996).

The SGS II is a developmental screening tool used by health professionals working with children aged from birth to 60 months across Flying Start areas in Wales. The SGS II assesses ten developmental fields including motor, language, social and cognitive development. The assessment includes parent-report questions and professionally administered tasks and can be administered in 20-minutes by a trained professional. Training takes place over one day. For the purpose of the current study only two subscales were utilised, the hearing and language (receptive), and speech and language (expressive) domains. To score each of the SGS II subscales a developmental quotient (DQ) was calculated by comparing the child's score with standardized normed values. This method of scoring the SGS II has demonstrated good sensitivity and specificity when compared with the Griffiths Mental Development Scales (Griffiths, 1954; 1970). The procedure for this method is described in Williams, Hutchings, Bywater, Daley and Whitaker (2013).

Results

Development of the Complex Language Measures

The 11 categories associated with social communicative function were subjected to principal component analysis (PCA) with three components emerging. Prior to performing PCA the suitability of the data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of 0.30 and above. Alternative questions, where the parent gave the child a choice between two options, were removed prior to further analysis due to low frequencies. At both pre- and post-intervention assessments parent imperatives demonstrated loading across several factors and were removed from analysis. The remaining nine categories were subjected to PCA using Varimax rotation. PCA using the pre-intervention data resulted in three components with eigenvalues exceeding one, explaining in total 69% of the variance. PCA analysis was then repeated using the post-intervention data. The same three components emerged with eigenvalues over one, explaining in total 67% of the variance. Table 1 presents the three component structures.

Affirmatives were the only category to load inconsistently across pre- and post-intervention assessments (Table 1). Due to its high loading with encouraging interactions at both time points a decision was made to manually assign this category to this factor. Thus, each of the three factors were manually calculated using raw scores within SPSS. The three factors created were labeled as:

1. *Parent Prompts.* The sum of all questions (wh-, yes/no and auxiliary fronted yes/no) and declaratives. This category was positively related with encouraging language ($r = .532$, $p < 0.001$).

2. *Encouraging.* The sum of all affirmations, reflections and expansions. This category was positively related to parent prompts ($r = .532$, $p < 0.001$).

3. *Critical.* The sum of all prohibitions and prohibitory imperatives. This category was not related to any other complex category.

Development of Simple Language Measures

Two simple parent language categories were also constructed for comparison:

4. *Total words*. The sum of all nouns, verbs, modifiers and functors. This category was positively correlated with total different words ($r = .864$, $p < 0.001$), parent prompts ($r = .869$, $p < 0.001$), and encouraging language ($r = .526$, $p < 0.001$).

5. *Total different words*. The sum of all different nouns, verbs, modifiers and functors. This category was positively correlated with total words ($r = .864$, $p < 0.001$), parent prompts ($r = .821$, $p < 0.001$), and encouraging language ($r = .611$, $p < 0.001$).

All five categories (three complex and two simple) were checked to ensure normal distribution of residuals for regression analysis. From the three complex categories only parent prompts were normally distributed. Encouraging language was normalised at both pre- and post-intervention using square root methods, whilst critical language was normalised using log transformations.

Inter-rater Reliability

Training to be competent in using the coding scheme took approximately 12 hours. Inter-rater reliability (consistency across different coders) for the five categories of parent language measured pre-intervention was assessed using intraclass correlations (ICC's). Results demonstrated high levels of achieved reliability between coders for the three complex categories (r = .797 to .839, p < 0.001) and the two simple measures of total words and total different words (r = .853 to .923, p < 0.000).

Stability Over Time

Assessment of category stability over time indicated that from the complex scheme parent prompts (r = .619, p < 0.001) and encouraging language were both satisfactorily stable over six months (r = .572, p < 0.001). Critical language demonstrated weak stability over the longer term (r = .246, p = 0.021). Both simple measures, total words (r = .694, p < 0.001) and total different words (r = .747, p < 0.001), demonstrated good stability over time.

Construct Validity

Construct validity for each category was assessed via its relation with multiple risk using hierarchical regression. Correlations between the five individual indices of socioeconomic disadvantage and the five language categories were conducted to

assess suitability for further analysis. Family size failed to correlate with any measure of parental language and was excluded from analysis. Data from the remaining four risk factors were combined to provide an index of multiple risk. Scores ranged between zero and four. To ensure sufficient numbers for analysis the two and three risk factor groups were combined, providing three dummy variables representing multiple risk.

Five regression models were conducted. The dependent variables were the three complex (parent prompts, encouraging, and critical) and two simple measures (total words and total different words) of parental language. Child age, gender, and intervention status (parent allocated to treatment or control condition) were controlled for and entered in the first step. The three dummy variables of multiple risk were entered in the second step.

Complex measures.

Table 2 presents the results of the regression models for the three complex categories. Two or more SES risk factors were associated with a reduction in parent prompts ($p < 0.001$) such as questions and statements i.e 'where is the ball' and 'that ball is blue'. Four risk factors predicted an increase in critical language ($p = 0.018$) e.g. 'don't put that there' or 'stop doing that'. These results suggest some construct validity for these two categories of parent language.

Simple measures.

Table 3 presents the regression models for the two simple measures. Two or more risk factors were significantly associated with a decrease in both parental total words ($p < 0.001$) and total different words ($p = 0.001$). These findings indicate some construct validity for both simple measures of parent language.

Predictive Validity

The final step in the assessment of the complex measures was to examine their predictive validity via associations with child language outcomes. For this analysis only data for parents who completed the six-month post-intervention assessments ($n = 55$) were used. Both the receptive ($ICC = 0.460$, $p < 0.001$) and expressive ($ICC = 0.460$, $p < 0.001$) language subscales from the SGS II demonstrated moderate positive stability over time. Of the three complex measures, parent prompts measured pre-intervention demonstrated significant but moderate positive relationships with both child expressive ($r = .425$, $p = 0.001$) and receptive language ($r = .397$, $p = 0.003$) six months later. Encouraging interactions were shown to correlate weakly yet positively with receptive language ($r = .288$, $p = 0.033$) and moderately with expressive language outcomes ($r = .407$, $p = 0.002$). Critical language failed to correlate with either receptive or expressive language. Both total words and total different words were shown to correlate moderately and positively with both child receptive ($r = .480$ and $.441$, $p < 0.001$ and 0.001 respectively) and expressive language ($r = .412$ and $.406$, $p = 0.002$) outcomes six months later.

Stepwise linear regression assessed associations between pre-intervention parent language and post-intervention child language outcomes. The dependent variables were receptive and expressive language. As critical language failed to correlate with either of the two language outcomes only four sets of regression analyses were conducted using parent prompts, encouraging language, total words and total different words as independent variables. Child age, gender and intervention status were controlled for in all four models and entered in the first step.

Child receptive language.

The results from the two regression models conducted to assess the association between the two complex measures of parent language and child receptive language are presented in Table 4. Parent prompts (p = 0.002) such as 'can you show me the red one' were shown to be a significant predictor of child receptive language six months later, whilst encouraging language i.e. praise and expansions was not (p > 0.05). These findings suggest that parent's use of questions and statements promote children's ability to understand the language they hear six months later.

Table 5 presents the results from the two regression models conducted to assess the association between child receptive language and parental total words or total different words. Results indicated that both simple measures at the pre-intervention assessment predicted a significant benefit to child receptive language six months later, p = 0.001 and p = 0.005 respectively.

Child expressive language.

Both parent prompts (p = 0.005) e.g. 'what does the monkey say', and encouraging language (p = 0.006) e.g. 'your monkey impression is very good', were equally as predictive of child expressive language six months later (Table 4). These findings suggest that parents use of questions and statements, and encouraging language facilitates children's ability to put their thoughts into words in a way that makes sense and is grammatically correct six months later.

In addition, both simple measures total words (p = 0.004) and total different words (p = 0.006) were also shown to significantly benefit child expressive language six months later (Table 5). These results suggest that the overall amount and diversity of the vocabulary children hear contributes to their expressive language skills later on.

Discussion

Currently there is a shortage of effective robust measures of early child language difficulties that can be conducted by regular service staff such as Health Visitors or Children's Centre staff. The aim of the study was to describe the development of a complex coding scheme designed to assess parental language and to compare its construct and predictive validity with two simple language measures in order to establish which scheme would be more useful for early years staff such as health visitors or childrens centre staff, in screening and identifying

high-risk families for parenting interventions in order to support their toddlers language development. Nine categories of social communicative function, coded from 15-minute speech samples, were subject to factor analysis revealing three language factors within the data. The three complex categories (parent prompts, encouraging, and critical) achieved good inter-rater reliability and adequate stability over time. Parent prompts proved the strongest of the three complex categories evidencing good construct validity and benefits to both child receptive and expressive language outcomes. In comparison, the two simple categories, total words and total different words, achieved better inter-rater reliability and greater stability over time. Moreover, these categories were consistently predictive of child receptive and expressive language outcomes six months later. These findings suggest that simple counts (total words and total different words) of parental speech may be a useful addition to current methods for identifying families whose children are most at risk of poor language outcomes and their associated difficulties.

Contrary to previous research the critical parental language category on the complex scheme demonstrated the least stability over the short-term, attained the lowest rates of inter-rater reliability, and did not demonstrate any relation with child language outcomes (Hart & Risley, 1992; 1995; Masur et al., 2005; Mathis & Bierman, 2015; Taylor et al., 2009). It could be argued that as the current data is derived from a sample of parents who had previously received a parenting intervention the current findings could be influenced by programme attendance. Despite this, previous analysis of this category demonstrated no treatment effect,

possibly due to its low frequency in the presence of observers (Gridley, Hutchings & Baker-Henningham, 2015).

Evidence to support category construct validity indicated that parent prompts, 'critical language', total words and total different words were all affected at some level by increasing risk of disadvantage. Two to three risks appeared to be a cut off. At this point the overall quantity and diversity of parental speech directed towards the children significantly decreased whilst the amount of critical language increased. These findings support previous research that has indicated a negative cumulative effect of socioeconomic disadvantage on parenting behaviours, such as the overall quantity and quality of positive parental language (Burchinal et al., 2008; Gridley, Hutchings & Baker-Henningham, 2013; Hart & Risley, 1992; 1995; Vernon-Feagons et al., 2008). The present findings therefore provide further evidence to support the roll out of early intervention services to support and improve language and related outcomes for high-risk parents and their children (Allen, 2011a).

From the complex categories, 'parent prompts' predicted both receptive and expressive language whilst 'encouraging' language predicted expressive language six months later. These findings support previous research that has demonstrated the significant value of these strategies to support early child language development by encouraging the child to verbalise via a variety of different questioning techniques and through praise, repetition and expansions (Hart & Risley, 1995; Flynn & Masur, 2007; Levikis et al., 2015; Masur et al., 2005; Merz et al., 2014; Tamis-LeMonda et al., 2014). The findings obtained for the two simple

indices of parental language (total words and total different words) also corroborate previous research that has indicated a positive relationship between the overall quantity and diversity of parental language and subsequent gains in child language outcomes (Goldin-Meadow et al., 2014; Hart & Risley, 1995; Huttenlocher et al., 2010; Rowe et al., 2012). The two simple indices of language were consistently predictive of enhanced child language outcomes and in light of this, it is suggested that simple indices of parental language may prove complementary to current methods for the identification and targeting of families most in need of early intervention and support, for example via parent training.

Strengths

The main strength of the current study is that the measures of parental language were coded from video-recorded free-play observations conducted in the home. An independent researcher, who received minimal training, conducted inter-rater reliability checks and the high levels of reliability achieved reflects the ease with which these measures can be calculated from recordings of parents and children in typically busy home environments. In addition, the data relating to the two simple measures of parental language can be gathered relatively quickly and could be integrated into current service delivery provided by health visitors and other Early Years staff as part ongoing monitoring and assessment of a child's developmental progress over the first three years, e.g. a Health Visitor could observe for 10 to 15 minutes and tally the words on a brief score sheet.

Limitations

The main limitation is that the current study is opportunistic, i.e. uses previously collected data, and employed an adapted version of the Hart and Risley (1995) scheme with only 15-minute speech samples collected during naturalistic free-play. Previously, Hart and Risley (1995) developed five parental language variables, using the 30 categories derived from 60-minute averaged speech samples taken from a variety of daily routines. These five measures were developed based on their relation to child development data and demonstrated strong associations with socioeconomic disadvantage, child vocabulary, and vocabulary growth at three years. For the current study the three complex categories were developed from relations within the dataset. The methodological differences between the two studies may have impacted upon the results. For example, larger speech samples taken from daily routines might have been more representative of everyday parent-child interaction, and category assembly based upon relations with child language measures post-intervention may have produced similar levels of construct and predictive validity to those previously described by Hart and Risley (1995).

The current findings are based on a small sample in which the age of the children varied considerably (11 to 34 months). However, as parental speech varies as a consequence of children's developmental age and ability we controlled for child age in all analysis. Whilst age was not a significant predictor of outcome it is possible that the small sample size may have inflated significant results and

findings obtained with a larger sample may lead to different conclusions and thus the current findings should be treated with caution.

Finally, it should also be noted that the sample, that participated in the RCT from which the current data is drawn, despite living in a very disadvantaged FS community, all consented to take part in the research and consented to be videotaped playing with their children. As a result, the current findings may not be typical or representative of the wider general population as this particular sample of parents were motivated to enhance their children's development and their own wellbeing.

Implications

Future policy, guiding the protection of children's welfare in the early years stipulates that all parents should be offered the opportunity to attend universal parenting interventions to enhance their children's development (including language) and prevent problems before they manifest (HM Government, 2016). Previous evidence has suggested that targeting for these services should be based upon longitudinal monitoring of the child's development and should incorporate information from all aspects of children's learning environment (Department for Education, 2014; HM Government, 2015; Oberklaid et al., 2013). Standardized assessments of a child's development can be unstable over time (Dockrell & Marshall, 2014; Oberklaid et al., 2013) and current findings suggest that simple measures of parental language may complement or be an alternative to current developmental screening tools such as the ASQ (Squires & Bricker, 2009) in

England or the SGS II (Bellman et al., 1996) in Wales to enable effective early identification of those families who may benefit from specialised services.

Professionals and other early years staff who have frequent contact with children under the age of two, and who are also already undertaking routine parenting assessments or observations of the child, might be best placed to carry out the proposed assessment as part of current ongoing monitoring of developmental progress. For example, the Early Years Framework in England (Department for Education, 2014) undertaken for all children under the age of five, already includes observations of children's behaviour during play. The proposed simple scheme would require an additional 10 to 15 minutes of video-taped observation of the parent-child dyad, followed by extra time to transcribe and code the interaction, both of which could be completed relatively quickly using commercially available linguistic software (i.e. the Child Language Data Exchange System [CHILDES; MacWhinney & Snow, 1984] or the Systematic Analysis of Language Transcripts [SALT; Miller & Chapman, 1983]). Currently, routine assessments of children's development, using the ASQ (Squires & Bricker, 2009) and the SGS II (Bellman et al., 1996), are conducted by Health Visitors in England at the 9 and 18-month visit. The proposed assessment would be best embedded within these visits to supplement the results from these screening tools. This additional information would fit with the timing of the EYF progress review (at age two), providing additional information regarding the child's learning environment which may benefit from specialised, targeted services, such as parenting programmes.

Future Directions & Conclusions

Further research is required to better understand the feasibility of using simple measures of language to identify families most in need of targeted intervention. It is suggested that comparisons with other rigorous assessments of the family i.e. child developmental assessments, should be undertaken. Research needs to establish how interchangeable these measures are, but more specifically how reliable they are in accurately identifying families most in need of intervention. Researchers should also work alongside partner agencies to establish how easily such methods could be integrated into routine service delivery without affecting current workloads, or impacting upon financial budgets in addition to establishing age related norms.

In conclusion, complex categories can be considered a reasonable measure of parental language for research purposes based on their achievable levels of reliability and stability and some evidence of construct and predictive validity. However, for the purpose of screening parents who may benefit from an intervention, simple indices of parental language, i.e. total words and total different words may serve as an additional tool to complement current assessment protocols such as those incorporated in the EYF.

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Table 1

Varimax rotation of a three-factor solution for parental language pre and post-intervention.

	1 (Parent Prompts)	2 (Encouraging)	3 (Critical)
Declaratives	.703		
Wh-questions	.536		
Yes/No questions	.861		
Auxiliary fronted questions	.733		
Affirmatives	.433	.770	
Reflections		.804	
Expansions		.751	
Prohibitions			.961
Prohibitory imperatives			.967
% of variance explained at baseline	35.5%	21%	13%
Declaratives	.624		
Wh-Questions	.616		
Yes/No questions	.634		
Auxiliary fronted questions	.835		
Affirmatives		.816	
Reflective		.932	
Expansions		.824	
Prohibitions			.913
Prohibitory imperatives			.914
% of variance explained at follow up	18%	35%	14%

Table 2.

Regression model for the association between multiple risk and the five complex measures of parental language pre-intervention (n = 68)

	Parent Prompts					Encouraging					Critical				
	B	*SE B*	ß	R^2	Δ R^2	*B*	*SE B*	ß	R^2	Δ R^2	*B*	*SE B*	ß	R^2	Δ R^2
Step 1				0.00					0.15*					0.04	
Age	0.14	0.95	0.02			0.12	0.04	0.39**			0.00	0.01	0.08		
Gender	-2.46	12.68	-0.02			-0.23	0.47	-0.06			-0.13	0.09	-0.18		
Intervention	-1.30	13.32	-0.12			-0.08	0.49	-0.02			0.00	0.10	0.00		
Step 2					0.29***					0.15**					0.14*
Age	1.02	0.85	0.13			0.14	0.03	0.45***			0.00	0.01	0.02		
Gender	10.00	11.24	0.10			0.09	0.45	0.02			-0.17	0.09	-0.23		
Intervention	-9.60	11.70	-0.09			-0.36	0.47	-0.08			0.02	0.09	0.02		
1 Risk	-28.72	16.62	-0.25			0.60	0.67	0.13			-0.04	0.13	-0.05		
2-3 Risks	-67.00	15.63	-0.66***			-1.21	0.63	-0.29			0.03	0.12	0.04		
4 Risks	-74.83	18.07	-0.59***			-1.31	0.72	-0.26			0.35	0.14	0.37*		

Child age, gender and intervention status entered in the first step. Three dummy variables representing 1 risk, 2-3 risks and 4 risks (with no risk as the control condition) entered in the second step.

*** $p < .001$, ** $p < .01$, * $p < .05$

Table 3.

Regression model for the association between multiple risk and categories of total words and total different words pre-intervention (n = 68)

	Total Words					Total Different Words				
	B	*SE B*	ß	R^2	Δ R^2	*B*	*SE B*	ß	R^2	Δ R^2
Step 1										
Age	7.72	5.81	0.16	0.05		2.85	0.94	0.35**	0.14*	
Gender	-70.87	77.22	-0.11			-6.43	12.46	-0.06		
Intervention	59.47	81.08	0.09			12.59	13.09	0.11		
Step 2										
Age	13.52	4.97	0.29**		0.32***	3.64	0.86	0.45***		0.21**
Gender	10.57	66.10	0.02			4.91	11.39	0.05		
Intervention	5.90	68.76	0.01			4.85	11.85	0.04		
1 Risk	-211.22	97.73	-0.29*			-20.02	16.84	-0.16		
2-3 Risks	-450.36	91.88	-0.71***			-57.66	15.83	-0.53**		
4 Risks	-494.56	106.26	-0.63***			-66.80	18.31	-0.50**		

Child age, gender and intervention status entered in the first step. Three dummy variables representing 1 risk, 2-3 risks and 4 risks (with no risk as the control condition) entered in the second step.

*** $p < .001$, ** $p < .01$, * $p < .05$

Table 4.

Regression models for complex measures of parental language and their associations with child language outcomes six months later (n = 55)

	Receptive Language			Expressive Language		
	B	SE	ß	B	SE	ß
Parent Prompts						
Age	0.72	0.56	0.16	0.50	0.66	0.10
Gender	1.37	7.63	0.02	7.70	8.92	0.11
Intervention	8.26	7.87	0.13	7.37	9.20	0.10
Parental Prompts	0.23	0.07	0.40**	0.25	0.08	0.38**
Encouraging						
Age	0.50	0.68	0.11	-0.21	0.74	-0.04
Gender	1.88	8.20	0.03	7.30	8.96	0.10
Intervention	7.89	8.45	0.13	7.37	9.23	0.10
Encouraging	3.35	2.21	0.23	6.91	2.42	0.41**

Child age, gender and intervention status entered in the first step.

*** $p < .001$, ** $p < .01$, * $p < .05$

Table 5.

Regression models for simple measures of parental language and their associations with child language outcomes six months later (n = 55)

	Receptive Language			Expressive Language		
	B	SE	ß	B	SE	ß
Total Words						
Age	0.48	0.57	0.11	0.26	0.67	0.05
Gender	4.19	7.49	0.07	10.65	8.86	0.15
Intervention	-5.80	7.74	-0.09	-4.82	9.16	-0.07
Total Words	0.04	0.01	0.45**	0.04	0.01	0.40**
Total Different Words						
Age	0.16	0.63	0.04	-0.15	0.73	-0.03
Gender	2.69	7.73	0.04	9.10	8.93	0.13
Intervention	-6.08	8.00	-0.10	-4.95	9.25	-0.07
Total Different Words	0.22	0.07	0.41**	0.25	0.09	0.41**

Child age, gender, intervention status and simple measures entered in the first step.

*** $p < .001$, ** $p < .01$, * $p < .05$