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RESEARCH REPORT

Happy Talk: A pilot effectiveness study of a targeted-selective speech–language and communication intervention for children from areas of social disadvantage

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Abstract

Background: Despite the public health implications of language difficulties associated with social disadvantage, there is a dearth of effectiveness studies investigating the effects of targeted speech and language programmes in this area.

Aims: To determine the effects of a targeted selective community-based child language intervention programme (Happy Talk), which simultaneously engaged with parents and early childhood educators, in the Republic of Ireland.

Methods & Procedures: A mixed methods methodology was applied with quantitative outcome and qualitative process data collected. Effectiveness was examined using a quasi-experimental single blind study design comparing Happy Talk with 'usual care' across four preschools. Qualitative process data were also gathered to examine the acceptability and feasibility of the Happy Talk approach in practice, and to identify factors to improve the probability of successful wider implementation. Child language (PLS-5) and quality-of-life measures were administered pre- and immediately post- the 11-week intervention. Responsiveness was assessed as the parental outcome, and the oral language environment of preschools was measured using the Communication Supporting Classroom Observation Tool (CSCOT). Retrospective acceptability was analysed with reference to the theoretical framework of acceptability (v 2).

Outcomes & Results: Pre-/post-expressive and composite language scores were collected for 58 children, and receptive scores for 54 children. Multiple linear regression revealed significant intervention effects for comprehension and total language with large and moderate effect sizes, respectively (0.60 and 0.46 SD). No significant effect was shown for parental responsiveness. No effects were found for the preschool environment or children's quality of life. Preschool staff deemed

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the programme to be an acceptable method of enhancing children's speech and language skills and rated the intervention positively.

Conclusions & Implications: The Happy Talk pilot effectiveness trial shows that comprehension can be improved (with a large effect) in preschool children from areas of social disadvantage, following an 11-week intervention, in which parents and preschool staff are simultaneously engaged. The ecological validity of the programme, as well as feasibility and acceptability to staff, make it a suitable programme to be delivered at scale.

KEYWORDS
Speech and Language, Effectiveness trial, Intervention, Social disadvantage, Children

What this paper adds

What is already known on the subject

- Up to 50% of children from socially disadvantaged areas enter preschool with speech and language difficulties. The majority of intervention studies are (1) researcher led; (2) efficacy trials carried out in ideal conditions; and (3) focus on working with parents or early childhood educators rather than engaging with both groups simultaneously. Many studies omit child language outcomes, and those that include them tend to show relatively modest effects for expressive language and negligible effects for receptive language.

What this paper adds to existing knowledge

- This pilot study shows that the Happy Talk programme, which is embedded in the community and which simultaneously engages with parents and early childhood educators, is highly effective in improving children's receptive language skills. These findings are particularly important in the context of (1) the study taking place in real world conditions; and (2) the programme being designed and refined by speech and language therapy services, rather than one which is researcher led.

What are the potential or actual clinical implications of this work?

- Implementing an 11-week targeted selective community-based language intervention can result in a large positive effect on receptive language for children from areas of social disadvantage. The study findings highlight the importance of embedding intervention programmes in the community and of simultaneously engaging with parents and preschool staff.

INTRODUCTION

Language difficulties associated with social disadvantage are a public health problem (Law et al., 2013). For a health condition to be considered a public health problem, certain criteria must be met. First, it must place a large and increasing burden on society, which in relation to poor language skills is well documented, with language skills being a key predictor of academic success, social competence and well-being (Field, 2010; Skibbe et al., 2008; McCabe & Marshall, 2006), literacy (Catts et al., 2002), social–emotional and behavioural difficulties (Beitchman et al., 2001; Qi & Kaiser, 2003) and poorer employment prospects (Law et al., 2009).

Second, the burden must be distributed unfairly, in that certain segments of the population are unequally affected.

The social gradient in child language abilities has been well established (McKean et al., 2018). Studies conducted in areas of social disadvantage have found 40–50% of children are entering preschool with speech and language skills significantly poorer than would be expected for their age (Locke et al., 2002). The problem is further exacerbated by findings that children and families, from socially disadvantaged areas, are less likely to access health and educational services (McManus et al., 2009), thereby widening the gap between them and their more advantaged peers.

Finally, to be considered a public health problem there must be evidence that early preventive strategies can substantially reduce the burden of the condition. This is perhaps the most contentious of the criteria, in relation to child language intervention evidence for those who are socially disadvantaged, particularly with respect to interventions that are carried out by community-based therapists/educationalists in a real-world setting. While some interventions have been shown to be efficacious with relatively small groups of children in very controlled settings, there is an urgent need to examine their effects when implemented in a real-world context.

This study aims to explore if a preventative intervention, embedded in the community can improve language abilities in children from socially disadvantaged areas. The intervention, which simultaneously engages parents and early childhood educators, aims to provide children with language-rich experiences so that they are supported to achieve positive language outcomes. Within a public health model our approach is considered a secondary prevention of which there are two categories, targeted-selective and targeted-indicated. Targeted-selective interventions are delivered to those considered to be most at risk of developing a condition, whereas targeted-indicated are used when early signs and/or risks of a condition are evident in the individual. Given the prevalence of language difficulties in socially disadvantaged groups, we apply a targeted selective approach to the delivery of our intervention in an attempt to identify and support the maximum number of children in need and potentially reduce the inequalities that exist.

Parent-mediated interventions

One of the most established public health practices recommended to reduce the gap in language ability, between socially disadvantaged children and their more advantaged peers, is the implementation of parental responsiveness interventions. Studies have shown that both home learning environment and maternal responsiveness are strongly associated with children's language outcomes, word letter knowledge and general school readiness (Chazan-Cohen et al., 2009; Levickis et al., 2014; Tamis-Le Monda & Bornstein, 2002).

There is a large degree of variability with respect to the quantity and quality of parent–child interactions, to which children from disadvantaged backgrounds are exposed (Schwab & Lew-Williams, 2016). When compared with those from more affluent backgrounds, children from low-income backgrounds are likely to experience fewer examples of rich language input (Hart & Risley, 1995), fewer opportunities for quality caregiver–child interactions and parenting styles that are less responsive to children's interests (Landry et al., 2001). As a result of observed differences, researchers and practitioners have developed interventions to support parents in developing children's communication skills. Such interventions provide parents with strategies to support their child's language development, in the context of naturally occurring routines. The focus is on increasing the frequency of the parents' use of contingent, responsive and developmentally appropriate language models (Gibbard & Smith, 2016). Parent-implemented programmes are reported to be effective with children with identified difficulties, such as global developmental delays (Roberts & Kaiser, 2011). However, evidence supporting their use with children at risk of poor language development due to social disadvantage is more limited. It is also problematic that studies reporting positive outcomes for changes in parental responsiveness, often omit to measure child outcomes (Cates et al., 2018; Leung, 2020).

Heidlage et al. (2019) carried out a systematic review and meta-analysis of parent-implemented language intervention studies (published between 2010 and 2016) that included child language outcomes for young children. While results from their meta-analysis suggest that parent-implemented interventions may be effective for increasing children's expressive vocabulary and expressive language, only six of the 25 studies included specifically focused on children at risk of poor language development due to social disadvantage. Play-based studies showed negligible effects for both receptive and expressive language (Guttentag et al., 2014; Sheridan et al., 2011). In contrast, shared book-reading studies were a little more promising for expressive vocabulary (ranging between Hedges' g = 0.30 and 0.38) (Boyce et al., 2010; Crain-Thoreson & Dale, 1999; Lonigan & Whitehurst, 1998) but again showed negligible effects for receptive vocabulary (Crain-Thoreson & Dale, 1999).

Other studies reporting child language outcomes and published since the Heidlage review report similar findings in that effects for expressive language are most consistently reported (Hatcher & Page, 2019; McGillion et al., 2017; Peredo et al., 2018).

In summary, research to date suggests positive intervention effects for expressive language, and minimal to no effects for receptive language. However, the number of studies and level of evidence available indicate that additional trials are needed, specifically in relation to socially disadvantaged children, and which include child language as an outcome.

Preschool educator-focused interventions

The impact of quality early childhood education on the developmental outcomes of children from disadvantaged backgrounds has also been well documented (Marulis & Neuman, 2013; Schachter, 2015; van Huizen, & Plantenga, 2018; Zaslow et al., 2010). Additionally, considerable evidence supports a direct association between language environments provided in preschool and children's language productivity and development (Girolametto & Weitzman, 2002; Justice et al., 2008; Mashburn et al., 2008). This association is likely to be particularly important for children from disadvantaged backgrounds (Justice et al., 2008) when attempting to narrow the gap between them and their more advantaged peers.

Consequently, professional development programmes have been developed in which early childhood educators are trained to create language rich environments and engage in responsive interactions. The premise is that improvements in educators' knowledge and practices will directly translate to improvements in children's language skills. Evaluations of language-focused professional development interventions do not often include child learning outcomes, focusing instead on practitioner outcomes. Of the few that do, findings are mixed particularly because of the variation in intervention focus and the associated outcomes, for example, shared book reading/literacy versus educator responsivity. Literacy-focused programmes consistently report positive findings for outcomes such as print concept knowledge, letter knowledge and phonological awareness, but there is less consistency for other language outcomes (Jackson et al., 2006; Markussen-Brown et al., 2016; Powell et al., 2010). Landry et al. (2009) and Wasik and Hindman (2011) are notable exceptions, demonstrating gains in expressive and receptive vocabulary, and phonological sensitivity. Professional development interventions involving literacy are also more likely to target specific vocabulary, which when used as the outcome measure are more likely to result in an intervention effect than when global language measures are used (Wasik & Hindman, 2011).

Professional development interventions that focus on educator–child responsive interactions take a less precisely prescribed approach, with the aim of creating language-rich environments across a broad range of activities. Findings in relation to child language outcomes are again inconsistent, with both positive (Piasta et al., 2012) and no effects (Cabell et al., 2011) reported. More recently, Eadie et al. (2019) investigated the effect of a language-focused professional development programme on the quality of educator–child interactions and on children's general vocabulary knowledge. Despite finding significant differences in the instructional quality of the educators who participated, relative to controls, they reported no differences in children's vocabulary knowledge. Eadie et al. (2019) suggest that early childhood educators may need regular input over a sustained period to effect change in children. An increase in quality of instructional support results in an increase in the 'dosage' of responsive interaction, as early educators engage in more frequent conversations with children, greater use of word-combination expansions and increased repetition of new vocabulary. This 'dosage' may need to exceed a minimum threshold before any impact on child language outcomes becomes evident and practitioners may need sustained support to deliver this 'dosage'.

Parent and preschool-focused interventions

Another way to increase dosage of instructional support, is to simultaneously engage with parents/caregivers and early childhood educators (e.g., Abecedarian approach; Sparling, & Meunier, 2019). The expectation is that by providing an intervention in more than one environment or by more than one person, the dose and dose frequency of exposure to language promoting strategies should increase. This in turn should increase the language gains made by the child. Interestingly, studies simultaneously engaging parents and early childhood educators are few (Greenwood et al., 2019), particularly when child language outcomes are measured. Stevens et al. (2019) explored the impact of the Abecedarian approach on the language development of First Nations and non-First Nations children and found that the pre-intervention gap that existed between the two groups (on a norm referenced language measure) was completely closed by the end of the second year of the intervention.

Other studies have compared interventions that involved parents or teachers alone to those in which both groups participated. However, findings are mixed. Hargrave and Senechal (2000) and Lonigan and Whitehurst (1998), for example, report no improvement in vocabulary outcomes for parent and teacher involvement over parent alone. Whilst Anthony et al. (2013) and Love et al. (2005) report an impact on receptive vocabulary, when their interventions were home *and* centre based rather

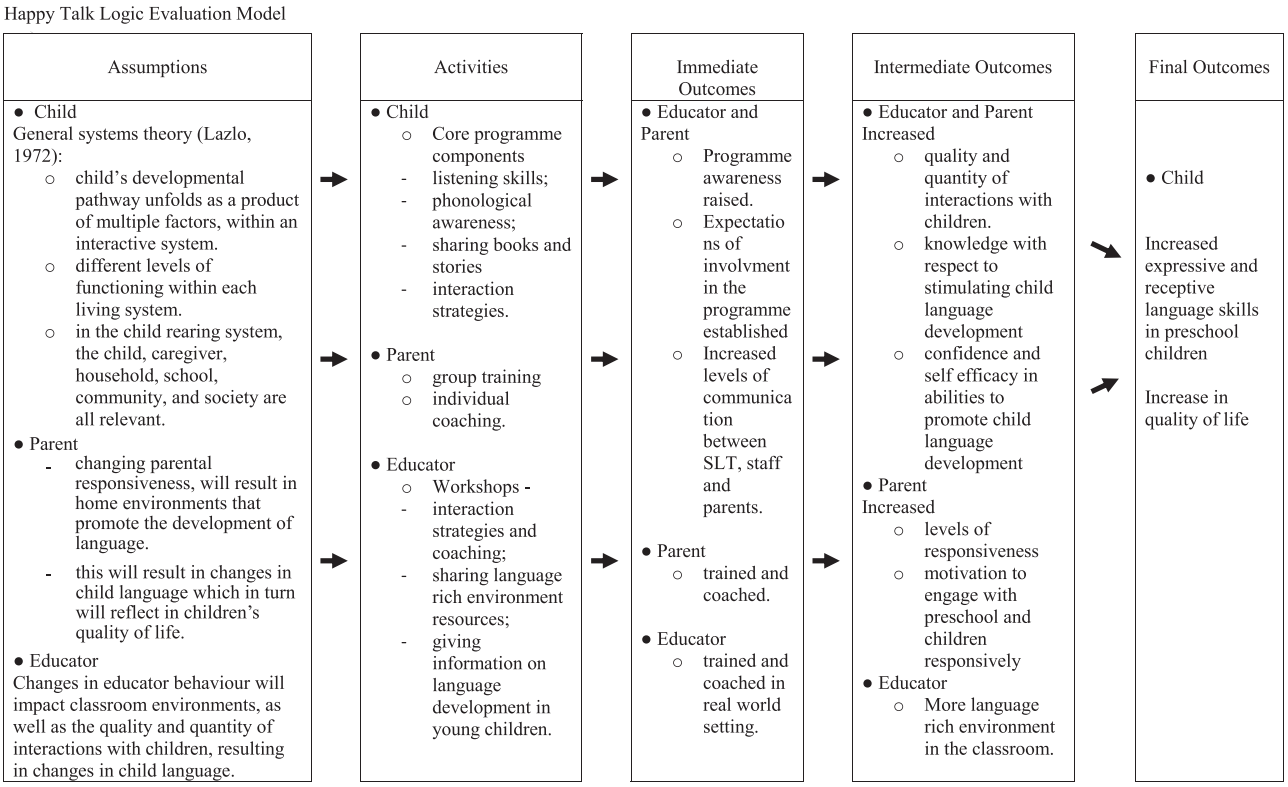


FIGURE 1 Happy Talk Logic Evaluation Model

than based in one setting or the other. To summarize, while targeting both groups could be considered a more strategic way of decreasing the development differences that emerge between children, due to social disadvantage, findings to date are in no way definitive.

Current study

In the current study we explore the effects of a targeted selective community-based language intervention programme ('Happy Talk'), which simultaneously engaged with parents and early childhood educators. Happy Talk is a partially state-sponsored, partially philanthropically funded programme that has been offered in one region of Ireland for the past 9 years. In 2017, the Health Service Executive (HSE) planned to expand the delivery of the preschool component of Happy Talk (for children aged between 2.08 and 5.06 years) to a new geographical area, under the same health jurisdiction. A collaboration between researchers and the HSE prior to this 'roll out' allowed us to complete a pilot evaluation of the programme in preschools in which there was no previous exposure to Happy Talk.

This trial differs from many others in that it is a pilot effectiveness rather than an efficacy study. Efficacy studies evaluate potential causal relationships between interventions and outcomes under ideal 'laboratory type' conditions, whereas effectiveness studies evaluate the effects of interventions under more typical real-world conditions. Effectiveness trials are relatively rare in the field of speech and language therapy (SLT), as many trials do not progress beyond the efficacy stage of evaluation. The need for more effectiveness trials, particularly in socially disadvantaged areas, was highlighted by Greenwood et al. (2019) in their recent review of language intervention research. Greenwood recommended that 'A high priority in future research is demonstrations that low-SES children's parents and caregivers can improve natural language environments and child outcomes as successfully as can research staff' (p. 15). The current study also differs from many others in that the intervention under evaluation is not researcher led, rather it has been designed and refined over the past 9 years by SLT services. Its development over time has resulted in a feasible and acceptable programme that can be delivered at scale and which has high levels of face validity for clinicians and educators.

Happy Talk is a manualized training and support programme delivered by SLTs to parents and early childhood educators in socially disadvantaged areas. The programme is embedded in the preschools and homes of socially disadvantaged children with the aim of effecting change in parent and educator behaviour (Figure 1 shows the Happy Talk Logic Evaluation Model).

Programme aims are (1) to improve the speech and language abilities of children through parent training and coaching and through working with teachers and early years staff; (2) to create a language rich environment in early years settings and the local community; and (3) to help children with more significant difficulties to link in with the appropriate services.

Following implementation of the programme, this study aimed to address the following research questions:

- Does a targeted selective intervention (Happy Talk) focused on increasing parent and early educator responsive interaction improve language and quality-of-life (QoL) outcomes in socially disadvantaged preschool children?
- Does Happy Talk enhance responsiveness and language promoting behaviours in home and early childcare contexts?
- Is Happy Talk acceptable to early childhood educators?

METHOD

Design

This mixed-methods study collected both outcome and process data. Effectiveness was examined using a quasi-experimental single-blind study design comparing Happy Talk to 'usual care' across four preschools. The results of this study will therefore add to our knowledge of intervention effects seen in real-world community-based programmes, representative of those in which parents and educators participate. In addition, qualitative process data were gathered to examine the acceptability and feasibility of the Happy Talk approach in practice and identify factors to improve the probability of successful wider implementation.

Following review and approval by the Clinical Research Ethics Committee of the Cork Teaching Hospitals, the six preschools serving children from disadvantaged backgrounds in a specific area of the south-west of Ireland were contacted and invited to participate in the 'Happy Talk' evaluation. Five of the six were categorized as Child and Family Resource centres (established in Ireland for children from disadvantaged backgrounds), and the remaining preschool was attached to a DEIS school (Delivering Equality of Opportunity in Schools, i.e., including a high concentration of students from socioeconomically disadvantaged backgrounds). A between preschool pre-/post-test design was used. Due to the small number of preschools specifically supporting socially disadvantaged children in the area, we did not use true random assignment of the preschools. With small numbers of preschools involved, it was likely that randomization would have resulted in significant differences between settings, with respect to factors that would affect the interpretation of results. To control for this, each of the six preschools was rated by two experienced SLTs using the Communication Supporting Classroom Observation Tool (CSCOT) (Dockrell et al., 2015). This is a tool designed to profile the oral language environment of the classroom. Four of the six preschools were rated similarly across dimensions by both raters and were therefore included in the study. The two remaining preschools were excluded as they were rated very differently by both therapists (33% difference between raters) and one had a total average score that was considerably higher than the other five preschools. It was also the case that although the latter preschool did serve an area of low socio-economic status, the demographic of the children attending was very different from the other preschools, in that it was primarily attended by well-educated families, where English was an additional language.

The four included preschools were subsequently allocated to either a treatment or control condition. The 2016 Pobal HP Deprivation Index is given for each preschool in Table 1. (The index is a method of measuring the relative affluence or disadvantage of a particular geographical area in Ireland.) There was no significant difference between the deprivation levels of the intervention versus the control preschools ($p = 0.87$). The aspiration was to provide the 'Happy Talk' programme to the control preschools the following year; however, this was dependent on government funding and was therefore not guaranteed. For this reason, the allocation to each condition was based on the numbers attending each preschool, so that the two larger preschools were prioritized to receive the intervention. Allocation was made by the first author, who had no additional information about the four participating preschools. The allocation was made following completion of all pre-intervention measures and, with the exception of the first author, all other parties involved were blind to which preschools would receive the intervention.

Participants

A total of 103 children attended the four included preschools, 65 of these attended the intervention preschools and 38 attended the control preschools. All children and their parents from the two intervention preschools were invited to take part in the Happy Talk programme and children and parents from the four included preschools, in the 'Happy Talk' evaluation. Children who were non-English speaking or who were queried as having an intellectual disability were excluded. Happy

TABLE 1 Child participant characteristics at baseline

Characteristic	Observations	Intervention ($n = 56$)	Control ($n = 25$)	p-value
Age (months)	81	43.9	44	0.96
(SD)		7.3	6.3	
Minimum–maximum		36.6–51.2	37.7–50.3	
PLS-5 (SS)				
AC	65	87.3 ± 14.9	91.9 ± 10.7	0.20
EL	64	89.5 ± 11.5	88.9 ± 11.3	0.84
Total	64	87.7 ± 13.2	89.6 ± 11.1	0.57
Quality of Life (SS)				
PEDS-QL (Phys)	62	91.3 [83.7, 96.2]	94.0 [90.4, 98.6]	0.05
PEDS-QL (PsySo)	62	97.5 [93.8, 100]	95.2 [90.4, 100]	0.20
PEDS-QL (Total)	62	92.3 [88.4, 96.1]	94.0 [90.2, 97.6]	0.55
CHU9D	63	96.7 [91.5, 100]	98.2 [95.2, 100]	0.47
Sex	81			0.11
Female		28 (50%)	7 (28%)	
Male		28 (50%)	18 (72%)	
Proportion of children with	64			
language WNL		20 (46.5%)	8 (38.1%)	0.71
No		23 (53.5%)	13 (61.9%)	
Yes				
Already attending SLT	81			0.66
No		43 (76.8%)	21 (84%)	
Yes		13 (23.2%)	4 (16%)	
Preschool 2016 Pobal HP	4			0.87
Deprivation Index		−15.94	−19.13	
		−25.15	−20.22	

Note: Age is mean age (months); SS, standard score with mean = 100, SD = 15. PLS-5, Preschool Language Scales—5th Edition (Zimmerman et al., 2014); AC, Auditory Comprehension; EL, Expressive Language; PEDS-QL (Phys), The Pediatric Quality of Life Inventory Physical Functioning; PEDS-QL (PsySo), The Pediatric Quality of Life Inventory Psychosocial Functioning; CHU9D, Child Health Utility instrument; and WNL, within normal limits. Pobal index ≥ 20 indicates that the area is very disadvantaged; a score < 20 is categorized as disadvantaged.

Talk training was open to all staff in the intervention preschools, but places were prioritized for those working with children who were participating in the study. Except for one intervention and one control staff member (both of whom had a level eight honours degree qualification), all other staff working in the evaluated rooms had similar qualification levels (level 5 certificate or level 6 higher certificate) Figure 2.

Happy Talk intervention

Happy Talk is a language intervention programme that aims to support children between 0 and 6 years living in areas of social disadvantage. It is designed for SLTs to work with parents and early educators in community settings, such as baby clinics, creches, preschools and junior infant classes (the first year of primary school). The focus of this study is solely on the preschool programme. The parent component includes twelve 1-h sessions delivered in two 30-min units, over the three terms of the preschool year (September–December, January–March and April–June). The skills targeted in each week of the programme are detailed in the additional supporting information. For the first 30 min, parents engage in group training with the SLT in a room within the preschool. This is followed by 30 min of coaching, with parents practising their newly acquired skills, with their children in the preschool.

In addition to the parent programme, preschool staff complete four workshops. The first (approximately 90 min) takes place in each preschool before the 12-week parent programme begins. The workshop focuses on the three core interaction skills to be covered with parents in term 1 as well as early literacy and phonological awareness skills. The workshop gives staff the opportunity to practise these skills using a range of unprescribed preschool toys. It is followed by a 30-min coaching session with staff in their respective preschools, where staff practice using the skills under the SLT's supervision. This method of professional development training is in keeping with that recommended in the literature (Elmore, 2002; Putnam & Borko, 2000), in that adults

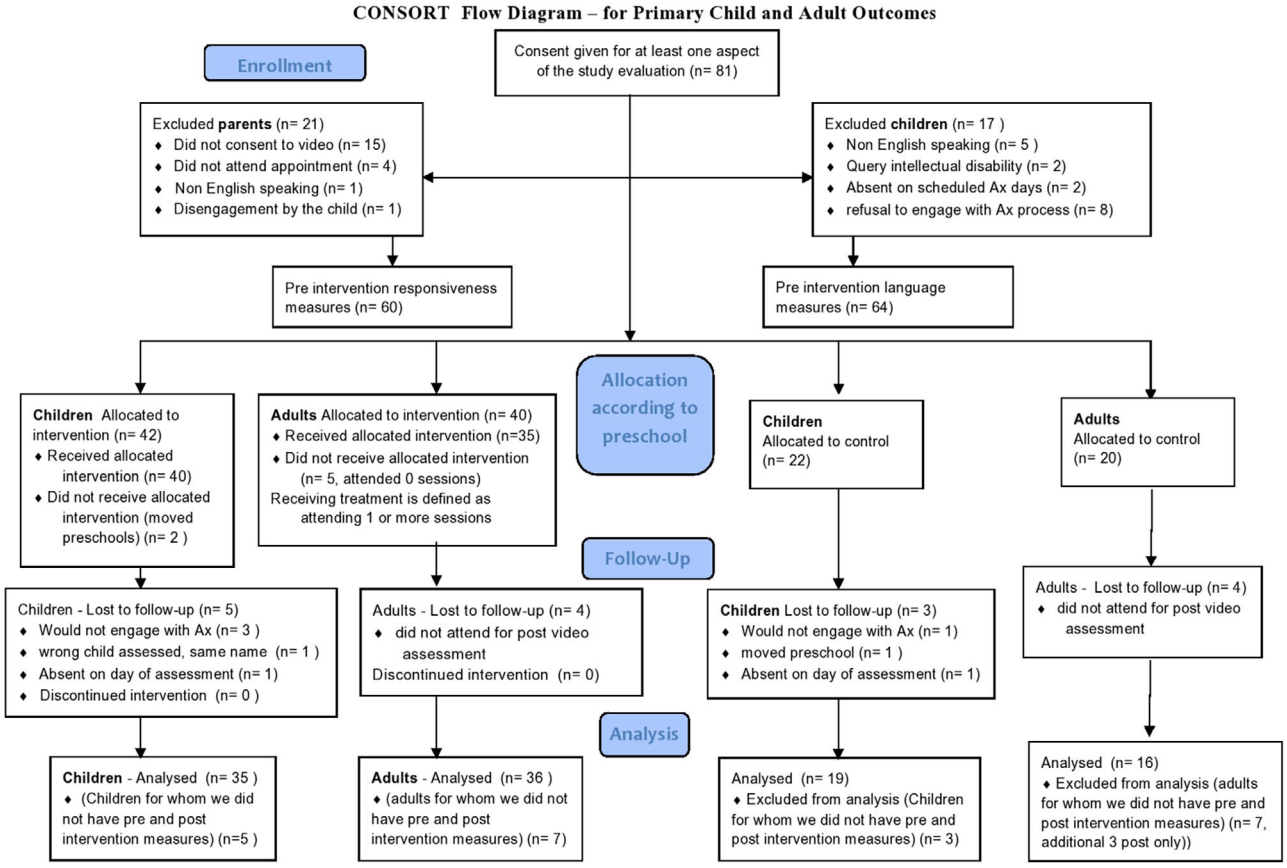


FIGURE 2 Flow of parent and child participants through the evaluation [Colour figure can be viewed at wileyonlinelibrary.com]

are thought to learn most effectively if given the opportunity to practise specific skills; if the learning takes place in a real-world context; and if the experiences are extended over a period of time. The remaining three workshops typically take place following each 4-week parent intervention block. Core components of these workshops include revision of the interaction skills previously outlined; sharing language rich environment resources; giving information on language development in young children and on identifying children with speech, language and communication needs; and sharing speech and language tools that aid with the transition from preschool to school.

Some necessary adaptations were made to the Happy Talk scheduling because of our evaluation. Preschool and parental consent was obtained at the beginning of the preschool year (September 2018) and subsequently all baseline assessments were carried out. As a result, the implementation of Happy Talk could not start until November 2018 and the programme was therefore delivered over a shorter period than usual. In addition, due to illness, the programme was delivered over 11 rather than 12 weeks. To accommodate this, sessions 9 and 10 were extended so that the language activity which was not covered in session 8 could be integrated into the following two sessions.

Outcome measures

Child baseline and outcomes

The Preschool Language Scale 5 (PLS-5) (Zimmerman et al., 2014) was the primary child language outcome measure and is a direct child assessment. Secondary child outcome measures were the Paediatric Quality of Life Inventory (PedsQL) Parent report for Toddlers (ages 2–4) (Buck, 2012) and the Child Health Utility instrument (CHU9D) (Furber & Segal, 2015). Both are parent proxy-report scales of health-related QoL in young children.

Parent baseline and outcomes

The Maternal Responsive Behaviours Coding Scheme (MRBCS) is an observational coding scheme of parent–child interaction and was the primary parent outcome measure. The tool was developed by Levickis et al.

(2014), who identified four parental responsive behaviours which were associated with later child language outcomes: Expansions; Imitations; Responsive Questions; and Labels. Implementation of the MRBCS yields a total number of occurrences of each parental responsive behaviour, for a given period. By summing the frequency scores for each behaviour, an overall score of parental responsiveness can be calculated. The rate of each behaviour per minute can also be computed.

Preschool setting baseline and outcome

The Communication Supporting Classroom Observation Tool (CSCOT) developed in the UK as part of the Better Communication Research Programme (2012) was used to match preschools at baseline. The tool was designed to describe the oral language environment of the classroom and is made up of three dimensions; Language Learning Environment (LLE) (scored based on 19 observations); Language Learning Opportunities (LLO) (scored based on five core observations, each one to be observed five times); and Language Learning Interactions (LLI) (scored based on 20 observations, again each one five times). The total possible composite score is therefore 144. In relation to educator specific outcomes, previous literature differentiates between process and structural quality (Markussen-Brown et al., 2016). The dimensions included in the CSCOT reflect these outcomes. Process quality (the instructional processes and interactions that occur within the preschool setting; Pianta et al., 2005) is measured through the Language Learning Interactions and Language Learning Opportunities dimensions, while structural quality (changes in structural features of the classroom/physical environment, facilitated by the preschool educator) is measured through the Language Learning Environment dimension.

Acceptability outcomes

Focus groups were conducted to ascertain if the programme was acceptable to the preschool staff. To analyse retrospective reports of its acceptability, the theoretical framework of acceptability version 2 (TFA v2) (Sekhon et al., 2017) was applied. This framework includes seven component constructs designed to reflect the extent to which those delivering and or receiving a healthcare intervention consider it to be appropriate. The seven constructs are Affective Attitude; Burden; Ethicality; Intervention Coherence; Opportunity Costs; Perceived Effectiveness; and Self-efficacy.

Procedure

Prior to the start of the preschool year, and following consent from each preschool manager, parents were given information leaflets and consent forms to indicate their willingness to participate in the evaluation. The third author (AOS) offered to meet with all parents to explain the consent process and what was involved with respect to the evaluation. Parents in two of the four settings (one intervention and one control) met with the third author to discuss what was involved. In each of the other two settings, parental queries or concerns were dealt with within their respective preschools. The four preschools were then assigned to either a treatment or control condition. The two preschools in the treatment condition received the 'Happy Talk' intervention programme over the following 7 months. The control preschools conducted their daily activities as usual.

Language measures

All pre- and post-intervention language assessments were carried out and scored by SLTs with no involvement in Happy Talk who were blind to treatment/control arm. The PLS-5 was carried out over a period of 3 weeks by four therapists pre- and post-intervention. Children were seen on a one-to-one basis within their respective preschools. Parents were given the option to attend the individual assessments, but no parents chose to attend. While completing the post-intervention language assessments, two children in one setting revealed that they were part of the Happy Talk programme by asking about one of the puppets used in the intervention and by naming the therapist who delivered the intervention. To maintain blinding, another SLT was recruited to complete the remaining assessments in this setting. Prior to the completion of language assessments, the hearing of each participant was tested using the Ling six sounds test. This is deemed to be an appropriate measure of the ability to hear speech at conversational loudness level (Yoshinaga-Itano et al., 2000).

Quality-of-life (QoL) measures

Pre- and post-child QoL measures were completed with participating parents over the phone. Both were completed in a single phone call, and counter-balanced for order effects. For consistency and to assist with blinding, two therapists administered the QoL measures with all parents (one for the pre- and one for the post-intervention

measures). Both therapists remained blind to intervention/control condition.

Video observation measure

Two SLTs recorded the pre- and post-intervention video observations. The SLT who recorded the pre-videos was blind to group. The post-intervention videos were recorded by the interventionist, in a quiet room in each child's respective preschool. An iPad was used to record the session and was placed on a tripod at one end of the room. The interventionist set up the room, gave instructions to the parent as scripted on the protocol, turned on the iPad and left the room before the interactive play session began. A blanket was placed on the floor in each room, with a bag of toys on either end. One bag contained a nurturing set and the other a set of farm animals, and a toy from each toy set was laid beside each bag. Parents were asked to play with their child as they normally would at home, for 7 min. They were told that their child could play with any toy, in either bag, or other toys in the room if they wished. After a period of 7 min, the SLT re-entered the room to turn off the iPad. Coding of the videos were carried out by SLTs with no involvement in the delivery of the programme. With the exception of three post-intervention videos, in which children talked about the interventionist, video coders were blind to both time (pre/post) and condition (treatment/control).

Preschool observation measure

Preschool settings were rated pre- and post-intervention by two experienced SLTs blind to intervention condition. The tool was administered in one room, at the same time in the morning, in each of the four preschools. During one of the post-intervention ratings, a child revealed that the preschool under observation had taken part in 'Happy Talk'. Therefore, to maintain blinding, a third SLT was asked to rate each setting and her ratings were compared with the rater who became unblinded. There were no significant differences between rater 2 and rater 3's post-intervention observation scores on the LLO or LLE dimensions ($p = 0.18$ (LLO), $p = 0.57$ (LLE)). In addition, the original two raters were more closely aligned post-intervention and therefore we report these two raters for these dimensions. However, significant differences emerged between raters two and three post-intervention on the LLI dimension ($p = 0.0006$), we therefore report the average scores of the three raters for this dimension.

Programme acceptability

To ascertain if the programme was acceptable to preschool staff, two focus groups were carried out (one in each of the Happy Talk preschools), attended by three and five staff members, respectively. The focus groups were facilitated by an SLT who was not involved in Happy Talk but who was an experienced qualitative researcher. With consent from the preschool staff, the focus groups were video recorded and observed individually by the first and fourth authors (PF and AC) both of whom had no direct involvement in the implementation of 'Happy Talk'. The audio from each group was transcribed and reviewed for accuracy by both authors. To examine the extent to which the intervention was deemed appropriate we then categorized and analysed the data with reference to the seven component constructs from the TFA (v2) (Sekhon et al., 2017). Specific quotes that addressed more than one component construct were discussed in relation to the context of the question asked and a consensus was agreed regarding 'best fit'. Focus group questions are given in the additional supporting information.

Data coding and reliability

To ensure consistency of assessment delivery, SLTs who administered the PLS-5 attended a training day with a senior SLT who was experienced using this assessment. Children's responses were scored live while administering the assessment. A second SLT blinded to the participants' group allocation, independently scored 20% of the assessments to determine the reliability of the online scoring. Point-to-point agreement between raters was 99.7%.

With respect to the MRBCS, two SLT research assistants completed a training protocol under the guidance of the author of the coding scheme. One therapist was the primary coder (EM) and the other was trained to carry out the reliability coding. Each SLT rated three training videos which were then compared with the ratings of the author. A criterion of 80% agreement was required before progressing to rate the study videos. EM achieved this level of interrater agreement based on the three videos. The second (reliability coder) did not reach the criterion of 80% following her first coding. The three videos were reviewed and disagreements were discussed. Due to issues of consent, we did not have access to further pre-rated training videos within the time constraints of the study. We therefore chose five random videos from the current study to be independently rated by both raters. The

ratings were sent to the author of the MRBCS for further feedback and to increase the likelihood of increased reliability before rating the remaining videos. Based on these five videos the >80% criterion was achieved for both raters. Regarding the analysis of the study videos, all videos were assigned a number and de-identified with respect to group and time, to ensure blinding to both. Using a computer-generated random sequence, 21% ($n = 25$) of the videos were then randomly selected for double coding. Average agreement across the four responsiveness behaviours was 86%.

QoL measures were scored 'live' during each phone interview. Each form was allocated a number and using a computer-generated random sequence, 20% ($n = 23$) of the forms were then randomly selected for rescoring. Scoring agreement for the PEDsQL and the CHU9D was 100%.

Fidelity

Happy Talk is a manualized programme in which each component is clearly specified. The programme uses a standardized set of equipment and is implemented by therapists who are trained in its delivery. With respect to this study the same SLT implemented the programme in each of the preschools. She had significant experience with Happy Talk and has been involved in both devising and delivering the programme, for the past 7 years. This increased the ecological validity of the study and is contrary to most language intervention studies carried out with children living in deprived areas, in which research staff are the most common implementers of interventions (Greenwood et al., 2019).

To examine implementation fidelity, four of the 11 sessions were recorded (one per term in each of the two settings). However, unfortunately due to a technical fault the recordings from the first term were unable to be viewed or heard clearly. For this reason, implementation fidelity was rated based on the two remaining recordings, in accordance with the protocol laid out in the manual. Fidelity was rated by two raters independently and initial agreement was 90%. The items on which the raters disagreed were discussed and a consensus agreed. Five aims were specified in the manual, each of which was addressed with an activity broken down into two parts. Adherence fidelity (i.e., following the manualized protocol) was 100% for three of the five activities. A total of 50% for one activity in that one of the two parts was omitted and 0% for the final activity. This was a phonological awareness task which in the manual was specified as 'segmenting phonemes' but which was delivered as a task of blending phonemes. Importantly, there was 100% consistency in how the sessions were implemented between the two settings. The two sessions for which fidelity was low were discussed with the treating therapist. She explained that because of relative strengths observed within participating children over the years, there had been some changes to the programme as it evolved. Some of these changes had not yet been reflected in the manual. In relation to the particular phonological awareness task above, the intention was in fact to deliver it as a blending task and therefore adherence was in fact 100% for this task.

Statistical methods

Key child and parent characteristics were described by means and standard deviations (SD) and total ranges when continuous; and by their counts and percentages when categorical. Using an intention to treat principle, intervention effects on PLS-5 outcomes (AC, ES and total) and parental responsiveness (Maternal Responsive Behaviours Coding Scheme) were estimated with multiple linear regression, adjusted for baseline scores (i.e., analysis of covariance—ANCOVA), using complete case samples (those for whom we had pre-/post-data). Given that there were not enough preschools to support a random effects approach (McNeish & Stapleton, 2017), to account for potential clustering of outcomes at the preschool level we also reported estimates that are further adjusted for preschool using fixed-effects (see Table S2 in the additional supporting information). Standardized and non-standardized effect estimates from these models were reported as baseline adjusted differences in means with 95% confidence intervals (CIs) and *p*-values.

QoL outcomes (PEDsQL and CHU9D) were similarly analysed using ordinal regression models with a logistic link function (i.e., the proportional odds model) with adjustment for baseline scores (Liu et al., 2017). This allowed us to account for the highly skewed continuous nature of the QoL outcomes. Effect estimates from these models were reported as baseline adjusted odds ratios with 95% CIs and *p*-values. Our use of baseline-adjusted models meant omitting a small number of observations that were missing baseline values. To evaluate the potential impact of missing outcome data, we re-estimated the models using multiple imputation based on predictive mean matching. The resulting loss in efficiency was more than offset by the adjustment for baseline, to the degree that baseline and outcome values were corrected. Details for this analysis are provided in the additional supporting information. All analyses were conducted using the R Project for Statistical Computing (R Core Team, 2020).

TABLE 2 Parent participant characteristics at baseline

Characteristic	Observations	Intervention (n = 56)	Control (n = 25)	p-value
Age (years)	78	38.9 ± 50.7	31.6 ± 6.4	0.5
Video pre-intervention	60			
MRBCS-Exp		5.0 ± 3.7	5.8 ± 3.9	0.46
MRBCS-Im		3.0 ± 2.4	2.5 ± 2.0	0.39
MRBCS-Res		4.9 ± 3.2	5.9 ± 3.4	0.27
MRBCS-Label		4.0 ± 3.0	4.2 ± 2.5	0.80
MRBCS-Total		17 ± 7.7	18.4 ± 7.5	0.50
MRBCS-Rate		3.4 ± 1.5	3.7 ± 1.5	0.50
Sex	61			1
Femal		36 (90%)	19 (90.5%)	
eMale		4 (10%)	2 (9.5%)	
Education level	49			0.02
Primary school		4 (12.1%)	1 (6.2%)	
Secondary school		6 (18.2%)	9 (56.2%)	
University		4 (12.1%)	2 (12.5%)	
Professional training		19 (57.6%)	3 (18.8%)	
Student		0 (0%)	1 (6.2%)	

Notes: Group comparisons are conducted using t-tests or chi-square (sex, education) analyses.
Abbreviations: MRBCS, Maternal Responsiveness Behavior Coding Scheme; MRBCS-Exp, Expansions; MRBCS-Im, Imitations; MRBCS-Res, Responsive Questions; and MRBCS-Label, Labels.

RESULTS

Children

We calculated pre-/post-expressive and composite language scores on a sample of 54 children and receptive language scores for 58 children. A total of 17 children were already receiving SLT intervention independently of their preschool. Three children came from bilingual homes where both Polish and English (n = 2) and Chinese and English were spoken (n = 1), one in the intervention and two in the control arm. The intervention and control groups were compared on six variables (Table 1). Based on those who responded significant group differences emerged for parental education. No group differences emerged on any other variable.

Parents

Responsiveness videos

We obtained 60 pre- and 57 post-intervention videos (50 of which we also had pre-intervention measures for). A total of 90% of parents who took part in the evaluation were mothers, and the majority of participants spoke English as the primary language of the home. Intervention and control parent groups were compared on four variables (Table 2). However, more than half of the parents did not report their education level (n = 49 out of a possible 81), which may have biased the result, particularly as the vast majority of the 49 were in the intervention group.

QoL

A total of 79 parents consented to take part in phone interviews to measure children's QoL (through the parent-report proxy measures). A total of 15 subsequently failed to respond when contacted (11 intervention, four control), resulting in the completion of 64 pre-intervention phone interviews. A further 14 parents did not respond when contacted to complete the post-intervention measures (nine intervention, five control), and an additional two parents (for whom we did not have pre-intervention measures) completed the post-intervention QoL interviews. As a result, 50 sets of pre-/post-QoL measures were analysed.

Preschool staff

A total of 22 staff took part in at least one aspect of the Happy Talk project, 15 of which were working in the preschool rooms attended by the participating children. Children receiving the intervention attended three different rooms in one preschool, with eight consistent staff members working in these rooms over the 12-week period of the intervention. Participating children attended two rooms in the other intervention preschool, with seven staff members working in these rooms, four of whom were

working for the full 12 weeks of Happy Talk and three of whom were present for 8 of the 12 weeks.

Child outcomes

With respect to the effects of Happy Talk on child language outcomes, multiple linear regression, adjusted for baseline scores, revealed a significant effect for auditory comprehension with a difference in means of 8 points (0.60 SD) between the control and intervention groups. A significant effect of 6 points was shown in total language score (0.46 SD), however it is likely that this is driven by the auditory comprehension effect. No effect was shown for expressive language score. Additional adjustment for the child's age and previous SLT involvement did not appreciably affect the estimate of the treatment effect from the reported models. Results from the regression are given in Table 3. Pre- and post-intervention data points are also illustrated for both groups on each language outcome in the plots in Figure 3.

With respect to children's QoL outcomes there was no intervention effect shown for either the PedsQL or the CHU9D. Results from the ordinal regression model are given in Table S3 in the additional supporting information. Regarding the Peds Total score the odds ratio was 1.2 ($p = 0.706$). and for the CHU9D measure the odds ratio was 0.89 ($p = 0.835$).

Parent outcome

Based on the video observation measure (the MRBCS), multiple linear regression adjusted for baseline scores showed no intervention effect on parental outcomes. The highest mean difference between the two groups was in *Expansions* and this was the closest to significance (M = –0.94, CI = –0.498 to 4.16, $p = 0.13$). The lowest mean difference was in *Labels* (M = –0.19 CI = –1.37 to 2.47, $p = 0.58$). The detailed results from the linear regression model are shown in Table S4 in the additional supporting information.

Preschool outcome

Because of the small number of preschools included in the study ($n = 4$), we could not carry out any formal statistical analysis. Table S5 in the additional supporting information shows the rater mean, pre- and post-intervention scores for the intervention and control preschools, along with the pre-/post-difference for each preschool. In relation to the overall CSCOT % score in the intervention preschools,

TABLE 3 PLS5 score distributions and estimated effects of the intervention on child language

		Means (SD)			Estimated difference in means (95% CI)		
Outcome/arm	***n***	**Baseline**	**Post-intervention**	**Difference**	**Effect estimate**	**Effect estimate (standardized)**	***p*-value**
PLS5-AC							
Control	20	92 (11)	85 (12)	−6.3 (8.8)	8.04 (2.6–13.50)	0.60 (0.19–1.01)	.005
Intervention	38	88 (14)	91 (14)	2.9 (12)			
PLS5-EL							
Control	20	89 (12)	90 (15)	0.55 (8.8)	2.89 (−2.04 to 7.82)	0.21(−0.15 to 0.56)	.26
Intervention	34	92 (11)	95 (14)	3.3 (8.8)			
PLS5-Total							
Control	20	90 (11)	87 (13)	−3.2 (8.4)	6.29 (1.67–10.9)	0.46 (0.12–0.80)	.01
Intervention	34	90 (12)	93 (14)	3.1 (8.3)			

Notes: Estimates are between arm differences in mean language scores at the end of the study, adjusted for baseline language scores.
Abbreviations: AC, Auditory Comprehension; EL, Expressive Language; TL, and Total Language score.

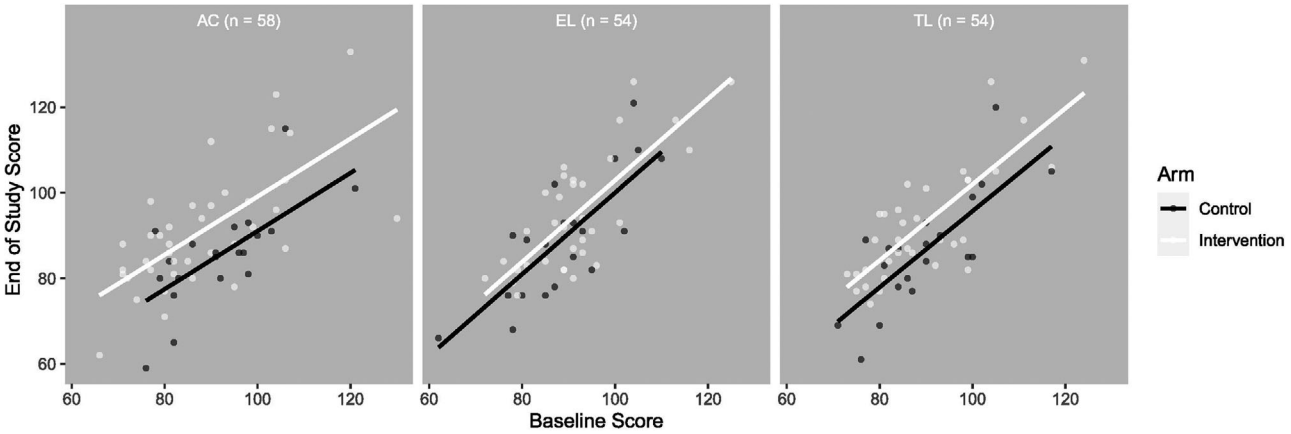


FIGURE 3 Regression plots for the PLS-5 language scores. These plots illustrate the linear (ordinary least squares—OLS) regression of the language score at the end of the study on the score at baseline, for each arm. Thus, the vertical distances between the arm-specific fit lines reflect the difference in mean scores at the end of the study-by-study arm (i.e., the estimated effects of the intervention given in Table 3). AC, Auditory Comprehension; EL, Expressive Language; and TL, Total Language.

preschool A showed a substantial increase (12.6%) and preschool C a negligible increase (0.57%) (skewed by a negative score on the LLI dimension). The two control preschools presented very different profiles, in that preschool B showed a substantial drop in total % score (18.6%), while preschool D showed a substantial % increase (15.6%). Looking at each specific dimension, no pattern emerged with respect to the intervention effect. Of the intervention preschools, Preschool A showed an increase across all dimensions, with the greatest increase in LLO. In contrast preschool C had the greatest increase in LLE, a smaller increase in LLO and a decrease in LLI score. The post-intervention profile of the two control preschools was dramatically different, with preschool B showing a very small increase in LLE score, a decrease in LLO and a dramatic decrease in LLI. In stark contrast, preschool D showed an increase on all three dimensions, particularly in the LLI dimension.

Process outcome

Overall preschool staff deemed the programme to be an acceptable method of enhancing children's speech and language skills and rated the intervention positively. Our focus group data were found to address six of the seven components included in the theoretical framework of acceptability. The Ethicality component was not addressed.

Affective attitude

How an individual feels about the intervention: staff highlighted how much they enjoyed the training and how much the children enjoyed participating in the programme. They noted that children were particularly happy when their parents became involved and believed that in relation to their learning, this was of huge benefit to the children.

Burden

The perceived amount of effort that is required to participate in the intervention; staff talked about possible changes in scheduling to facilitate more parents attending as they found it difficult to comfort children whose parents did not attend. However, they did acknowledge that there may be other reasons for a lack of attendance and noted an increase in attendance as the programme progressed. They suggested that it might have been helpful if a meeting had taken place to discuss the optimal time to hold the intervention sessions, in advance of the intervention commencing. In addition, one staff member suggested that the intervention might take place in a different room within the preschool so that they did not have to move all the chairs and pack away everything immediately after lunch.

Intervention coherence

The extent to which the participant understands the intervention and how it works; staff noted key components of the programme that they now understood to be relevant to the development of children's speech and language skills. They noted, in particular, the relevance of nursery rhymes; the exposure to new words that children may not hear at home; the importance of just listening rather than asking a

lot of questions; and the use of strategies such as modelling and repetition. They stated that they now believed in these strategies, as they could see them working in context. They also believed that the intervention sessions that took place in the classroom made the programme much more effective, than if the sessions had taken place without direct classroom work. Staff found the knowledge they gained about language development to be particularly helpful and noted that it was not something they learned much about in their childcare training.

Opportunity costs

The extent to which benefits profits or values must be given up to engage in the intervention; staff commented on the level of parental effort required, in that attendance was difficult for some parents as a result of work commitments.

Perceived effectiveness

The extent to which the intervention is perceived as likely to have achieved its purpose; staff reported improvements in children's speech and language skills as they progressed through the programme. They commented on the programme impact on peer relationships and social communication, and believed there was a reduction in 'unwanted behaviours' as a result of children's increased understanding and an improved ability to express themselves.

Self-efficacy

The participants confidence that they can perform the behaviour required to participate in the intervention; staff made several comments with respect to their confidence to implement the intervention. In particular, they noted a difference in the way they were speaking to children, both in relation to content and manner. They also felt equipped to educate new staff in what they had learned, so that they could keep the programme going. Staff quotes addressing the acceptability of Happy Talk are given in Table S5 in the additional supporting information.

DISCUSSION

This pilot trial addressed whether the Happy Talk programme, a targeted population level intervention, which engages parents as well as early childhood educators, was effective in increasing the language skills, in preschool children in areas of social disadvantage.

Child outcomes

Based on a global language measure, the programme showed a significant effect (effect size = 0.60 SD) on auditory comprehension and overall language score (0.46 SD). Applying the Education Endowment Foundation toolkit guidance, these effect sizes can be considered 'high impact', in the context of educational interventions. They demonstrate that Happy Talk is an effective intervention that can improve language skills in young children from socially disadvantaged areas, thereby narrowing the gap that exists between them and their more affluent peers.

In particular, Happy Talk showed a large effect for receptive language which is in contrast to the majority of previous studies, whether parents or early childhood educators are the sole focus, or both are engaged in the intervention. While Love et al. (2005) reported a receptive vocabulary effect on a standardized measure (following a home and centre-based intervention), the effect size was small, and the intervention was considerably longer (23 months). With respect to parent-focused language interventions for children who are socially disadvantaged, minimal to no effects for receptive language have been reported (Heidlage et al., 2019; Hatcher & Page, 2019; McGillion et al., 2017; Peredo et al., 2018). This is also the case in relation to early childhood educator programme trials (Markussen-Brown et al., 2016). While some studies have reported effects on specific items of vocabulary (Wasik & Hindman, 2019) these items tend to be those specifically targeted in the intervention and are therefore not reflective of broader learning. If interventions are to have a tangible effect on children's everyday functioning, then they need to have broader effects than on the very specific items included in the intervention. If benefits are so circumscribed as to relate only to the targeted items, it is hard to argue that they are clinically meaningful effects. Our global language measure does not reflect specific programme content and is therefore a more robust measure of meaningful change. Previous research has shown that measures reflecting specific programme content tend to show larger effect size estimates than broader measures (Yoder et al., 2013). In this regard, the Happy Talk effect size is particularly impressive.

Interestingly, although Happy Talk yielded a large effect for language comprehension, we did not get an effect for expressive language. Based on this study data, it is not possible for us to tease apart the reasons for this finding. Therapy activities included tasks that focused on both domains of language. The programme intensity (distribution of the intervention over time) may have been an influencing factor, as what is normally carried out over three terms (30 weeks) was implemented over a more condensed 20-week

period. In very young children, comprehension typically develops in advance of expression and therefore it may be a matter of outcome measure timing. Follow-up measures would allow us to determine whether the improvements shown in comprehension, would consolidate into improvements in expression, as well as whether the comprehension effect would be maintained. In addition, previous research exploring language profiles in socially disadvantaged children in Ireland found that 78.6% of children who were assessed on the CELF-P2 had higher expressive than receptive scores (Ryan et al., 2016). Potentially the implication would be that there was less scope for improvement in relation to expressive skills. However, based on the PLS-5 this discrepancy was not evident in the current cohort (expressive > receptive in 52% of children).

Additionally, we found no intervention effect for the QoL, secondary child outcome measures. Given the age of the children, the short duration of the intervention and the immediacy of the post-intervention outcome measure administration, it may be that an increase in language comprehension had not yet translated into an increase in QoL. However, it is well established that early learning results in self-motivation to learn more and that early mastery makes learning at later stages easier as well as more efficient. Given that children with low language skills experience health related QoL issues at twice the rate of their typically developing peers, we might expect that if more long-term outcome measures were taken a different result may have emerged.

Parent and preschool outcomes

Interestingly, although the intervention appears to have an effect on receptive language outcomes, we were unable to measure change in our hypothesized mechanisms of action, that is, responsive parental behaviour and communication supporting aspects of the classroom environment (see the Logic Evaluation Model in Figure 1). With respect to parental responsiveness, there were no significant effects. Given the significant outcome for children but not parents it is possible that the null findings are related to the power of our study and a large trial might reveal significant changes. The potential issue of our small sample size is also reinforced by the considerable variation shown in our parent interaction measures (expansions, in particular), reflected in the wide confidence intervals. Although this could remain even in a larger sample if the variability in outcome reflects the nature of the variability in response found in the population. Further work is needed with a larger sample to determine this. Previous literature suggests that expansions are a strong predictor of language outcomes (Levickis et al., 2014). It may be the case that the intervention was not sufficiently intensive in uptake to yield an effect across all dimensions of responsiveness. Our analysis uses an intention-to-treat protocol, however, 55% of parents attended fewer than five of the 11 sessions and only two parents (5%) attended the full complement of sessions. Other parental focused interventions, ranging from 10 weeks to six months in duration, for at risk children from disadvantaged backgrounds, have yielded positive parental outcomes (Hatcher & Page, 2019; Landry et al., 2008; Leung et al., 2020). However, it is likely that five sessions or less is not sufficient for parents to consolidate the use of responsive interaction strategies. This level of uptake is likely to have diluted any potential effect.

Regarding the language environment of preschools, our results show considerable variation in rater mean, pre-/post-difference scores. While there was a substantial overall % increase in one intervention preschool, this was also the case for one of the control preschools. Our results in relation to LLI (language interactions) are perhaps the most variable, with one intervention and one control preschool showing an increase (dramatic in the case of the control preschool) and one intervention and one control showing a drop (again substantial in the case of the control preschool). It is possible that the CSCOT is not sensitive to the very specific mechanisms which have resulted in the change we see in children's language, or that a more holistic evaluation of practices would need to be measured within each preschool to detect changes on this measure. The measure is based on observations of one room in each preschool at a single time point, pre- and post- the intervention. Therefore, only the staff that were working in the observed room were evaluated (between two and four staff in each room). However, as previously outlined 22 staff took part in at least one aspect of the Happy Talk project, 15 of which were working in the preschool rooms attended by the participating children. Therefore, if a broader change in preschool staff behaviour took place, the CSCOT may not have detected it.

It is, of course, possible that the hypothesized mechanisms of action measured here are not in fact driving the changes in the children's language development. Perhaps a more global change in the amount of time parents spend talking to their child due to an increased awareness of the importance of parent–child interaction might be at play and/or a change to lesson planning within the ECEs to incorporate more language learning opportunities for example. Further developing the logic model prior to a future trial would support the inclusion of a potentially more sensitive and comprehensive set of measures of intermediate outcomes.

Impact of the trial

Our null findings in relation to parent and preschool outcomes could also be a result of the impact of the trial on the implementation of the intervention. The trial was led by the first author and supported by a grant that allowed one staff member to be employed on the project. The remainder of the staff supports were provided by the North Lee SLT department (HSE). There was a very short lead in time between the awarding of the grant and commencing the trial and as a result no information about the intervention and its evaluation could be shared with parents, until the beginning of the academic year. Therefore, the process of obtaining consent was delayed, and following this, the process of administering all baseline measures. Establishing a baseline for a range of outcomes resulted in the programme being delivered over a more condensed period. The need for blind pre-intervention assessments meant that all assessments had to be completed before any staff knew which two preschools were receiving the intervention. This had a significant effect on the time frame during which the interventionist would typically have been working on motivating and building relationships with the preschool staff, an important component of behaviour change (Michie et al., 2014). The usual protocol for any new setting receiving the Happy Talk intervention, is that the preschool or creche manager is asked to nominate staff to take part in the Happy Talk Skills programme. The skills programme is completed over a minimum period of one academic term and often extends over the full academic year. The programme is designed to introduce staff to Happy Talk; to develop relationships and partnerships with staff; and to discuss capacity and willingness to engage with the programme. While it is not required, the completion of Happy Talk Skills usually results in the preschool staff organizing a parental engagement event. While the SLT interventionist did not consider parental attendance to be hugely dissimilar to other settings for which Happy Talk was in its first year, she did note the absence of a 'brand' recognition. Additionally, with such a short lead in time, there were no expectations on the part of parents that Happy Talk was one element of the service provided by their preschool. With a greater lead in time the experience of the Happy Talk team is that staff develop a more trusting relationship with the team and as a result they advocate for better parental attendance. In addition, parents themselves expect to be invited to attend as they have heard other parents and staff discussing the programme, and the Happy Talk team are familiar to parents and staff.

Despite these apparent lack of effects in parents and preschools, the cumulative effects of engaging both groups, resulted in improved language comprehension for participating children. Perhaps the mechanism of action, to effect change, is not measurable through the measures that we have used. It is likely that simultaneous engagement with parents and early childhood educators, either results in an increase in the dose and dose frequency of exposure to language promoting strategies or acts as a 'safety net' such that for any given child, the likelihood of optimal stimulation increases in at least one environment. By targeting both home and preschool it is more likely that our intervention is consistent in its focus and that it might meet the minimal levels of instructional support required to effect change in child language outcomes. In addition, targeted use of these strategies in varying linguistic contexts, serves to enhance consolidation of language learning.

Strengths

Our innovation is in the measurement of the effectiveness of a programme designed and implemented by SLTs in the community, rather than one that is researcher led. The Happy Talk programme incorporates components of therapy that are widely used and as a result has strong ecological validity. The manualized and tailored aspect meant that for the most part, the intervention followed an explicit replicable protocol. However, we did note some changes to the protocol, which have not yet been reflected in the manual. Preschool staff deemed the programme to be an acceptable method of enhancing children's speech and language skills and rated the intervention positively. This increases the likelihood of being able to scale up the project as many of the factors necessary for 'normalization' are in place (Murray et al., 2010).

Preschool staff were similar in education levels and levels of experience and the quality of facilities and resources did not vary significantly between preschools. Language outcomes were directly assessed with standardized measures, supplemented by parents' evaluations of children's well-being, to investigate the programme's broader effect. The research design included blinding of all directly assessed outcome measures as well as matching of preschools for study inclusion (on a standardized measure), to compensate for the lack of randomization. Finally, the study had high retention rates and documentation of attendance levels for both parents and preschool staff.

Limitations

Our study has a number of limitations. First, the preschool allocation to each condition was not random, but for ethical reasons was based on the two larger preschools

receiving the intervention and the two smaller preschools acting as controls. This may have resulted in selection bias. Due to the nature of this work, parent and setting participants could not be blinded to group membership, however the absence of an effect for parents and preschools suggests that a lack of blinding did not bias outcomes. With respect to generalizability, we excluded families with little or no English from the analysis as we did not have the resources to pay for translation. While this affected only one family, there is some uncertainty about how our findings would generalize to this group. We were limited in the number of preschools we could recruit in the new jurisdiction to which Happy Talk was being introduced. This in turn affected our overall numbers; our power to detect potential smaller effects; and our statistical methods. We did not have the resources to complete follow-up measures and therefore ascertain maintenance effects. Our technical fault resulted in fewer available sessions than are commonly reported, on which to base our fidelity measures. Finally, in an attempt to adhere to rigorous intervention standards, only one component of the Happy Talk programme (preschool) could be implemented and evaluated in the new area. Creches and other settings, such as parent toddler groups, were not included, to reduce the chances of sharing resources, particularly with regard to the control preschools. Usual practice is more inclusive so that those who do not get the full programme, get some level of input. In addition, Happy Talk is usually implemented as a trans-agency team, a practice that has been previously shown to enhance parental intervention uptake and attendance (Gibbard & Smith, 2016).

CONCLUSIONS

Our pilot trial shows that comprehension can be improved in preschool children from areas of social disadvantage before formal schooling starts. The Happy Talk intervention can therefore improve language and consequently potentially their social outcomes. The intervention has been shown to be feasible and is acceptable to preschool staff, making it suitable for implementation at scale. Follow-up outcome measures would have allowed us to look at the longer term impact of the programme and there is a need for replication of our findings in a larger randomized trial. An economic evaluation, to look at the overall societal cost benefit, is also needed. Given the societal cost of language difficulties, and the fact that early interventions, targeted towards young children from disadvantaged backgrounds, have much higher returns than later interventions (Heckman, 2006), further research into effective community-based interventions for young socially disadvantaged children, is essential in promoting social justice for all.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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