



# Testing the validity and usability of a new language monitoring and assessment tool: The BabyTalk app

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## Introduction

Children who enter school with good language skills have better chances in school, better chances of entering higher education, and better economic success in adulthood (Blanden, 2006).

Some children enter school with language skills up to 19 months behind their peers (The Sutton Trust, 2012). Because of this, it is important to identify children at risk of language delay early, and to put intervention packages in place to improve their language skills.

However, delivering and monitoring these interventions is difficult. First, it is difficult to monitor language growth because children are often too young to take part in clinic-based tests. Because of this, most studies on early language development failure to capture earlier stages, focusing on children aged 14 months and above. Second, it is difficult to communicate effectively with parents, especially low-income parents who do not regularly use early years services. Because of this, the children who often require the most help fail to receive it.

Psychology and Computer Science at the University of Liverpool are creating a solution to these problems: the *BabyTalk app* - a smart-phone enabled language monitoring and intervention tool. The app solves the communication problem by delivering, directly to parents, information about how to enrich the home environment for language learning. It solves the language monitoring problem by incorporating an online Communicative Development Inventory (CDI); a comprehensive checklist of the first words and gesture produced by children from as young as 8 months of age. CDIs are effective language monitoring tools used throughout the world because parents know far more about their child's language than a clinic-based or lab-based test can reveal.

**Aim:** This project is the first step in making the BabyTalk app fit for purpose by testing its criterion validity and ease of use.

## BabyTalk App

The BabyTalk app is a smart-phone web-enabled language monitoring tool that has been created by experts in speech and language development. The app allows parents to have a permanent online record of their child's first words and gestures. This tool offers the facility to quickly and easily track the progress of individual children over time. A simple questionnaire system (UK-CDI) allows parents to enter the data quickly using a checkbox function (see figure 1) and there's also the ability to upload photographs, time-stamped with the date and child's age. A diary function enables parents to record memorable moments and daily life (see figure 2).

## UK-CDI

The UK-CDI is a words and gestures checklist for parents of infants aged 8-18 months and is the first comprehensive overview of UK children's first stages in language development. The UK-CDI provides the first word learning norms for children aged 8-18 months across the whole of the UK. It will be attached to a free-for-all, anonymised online child that can also be used by professionals to assess children's language.

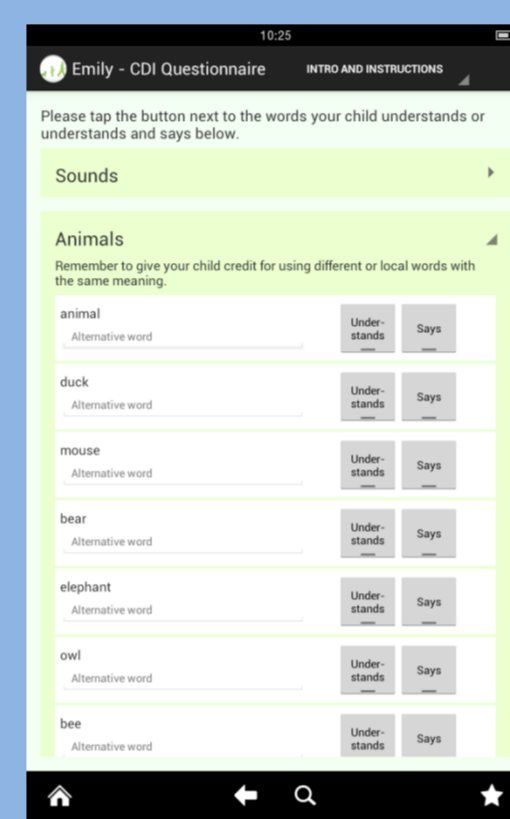


Fig. 1. A sample of the UK-CDI

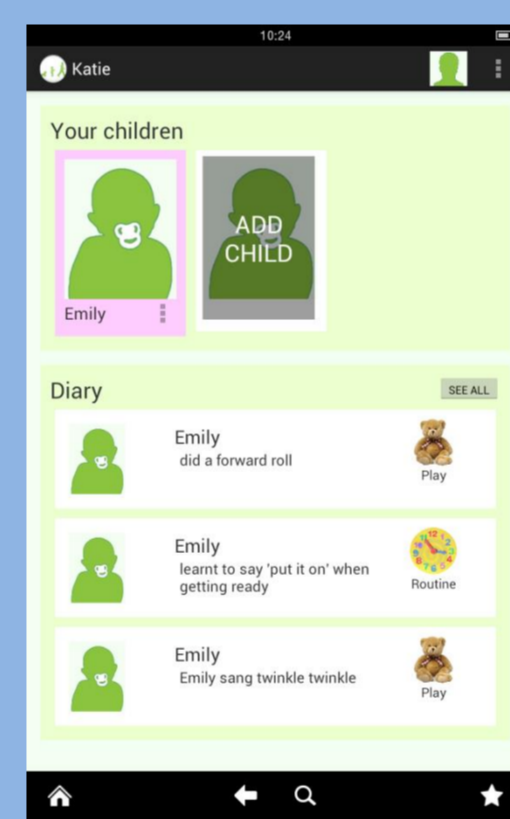


Fig. 2. Diary function

## Methods

### Participants

Participants were 20 children (x female and x male, aged 12-21 months) and their primary caregiver from English speaking families.

### Design & Materials

Parents completed the UK-CDI using the BabyTalk app. The Preschool Language Scale 4-UK was then used as a standardised test, as a measure of both early auditory communication and expressive communication. The auditory comprehension subscale is a measure of how much a child understands and the expressive communication subscale is a measure of how much a child says and communicates with others. An object selection task was used consisting of 20 items. 4 counterbalanced versions of this task were used.

### Procedure

Parents were asked to complete the UK-CDI using the BabyTalk app roughly a week before the study took place. Parents were sent a link which would enable them to download the BabyTalk app to their smart phones so that they could complete this at their leisure within the week before the study. Children were then tested using the Preschool Language Scale 4-UK either in the child language lab or in their home environment, based on their preference. The children then completed the object selection task, where the child had to select an object from a choice of two in response to "where is the ...", which assessed their comprehension of 20 specific words on the checklist.

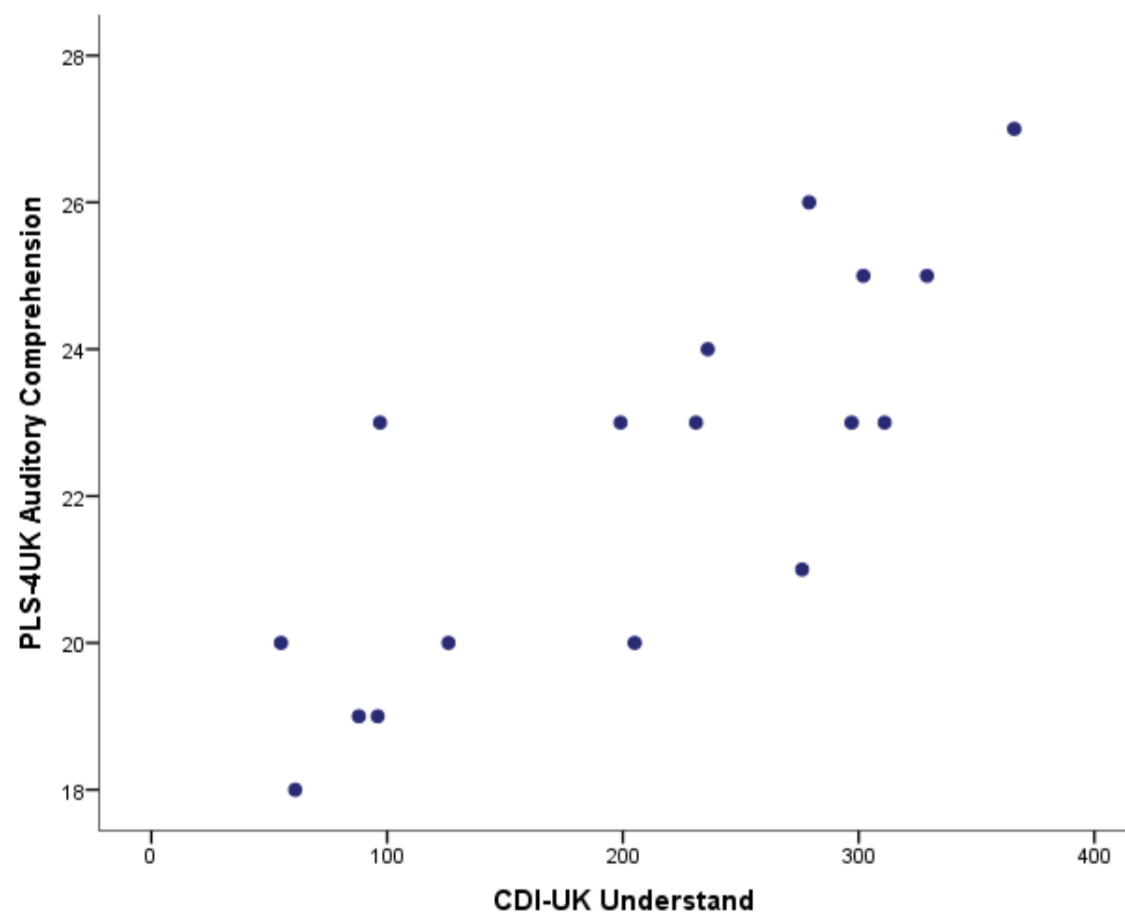


Fig. 3. Correlation between the auditory comprehension from the PLS-4UK and what parents say their child can understand, from the UK-CDI.

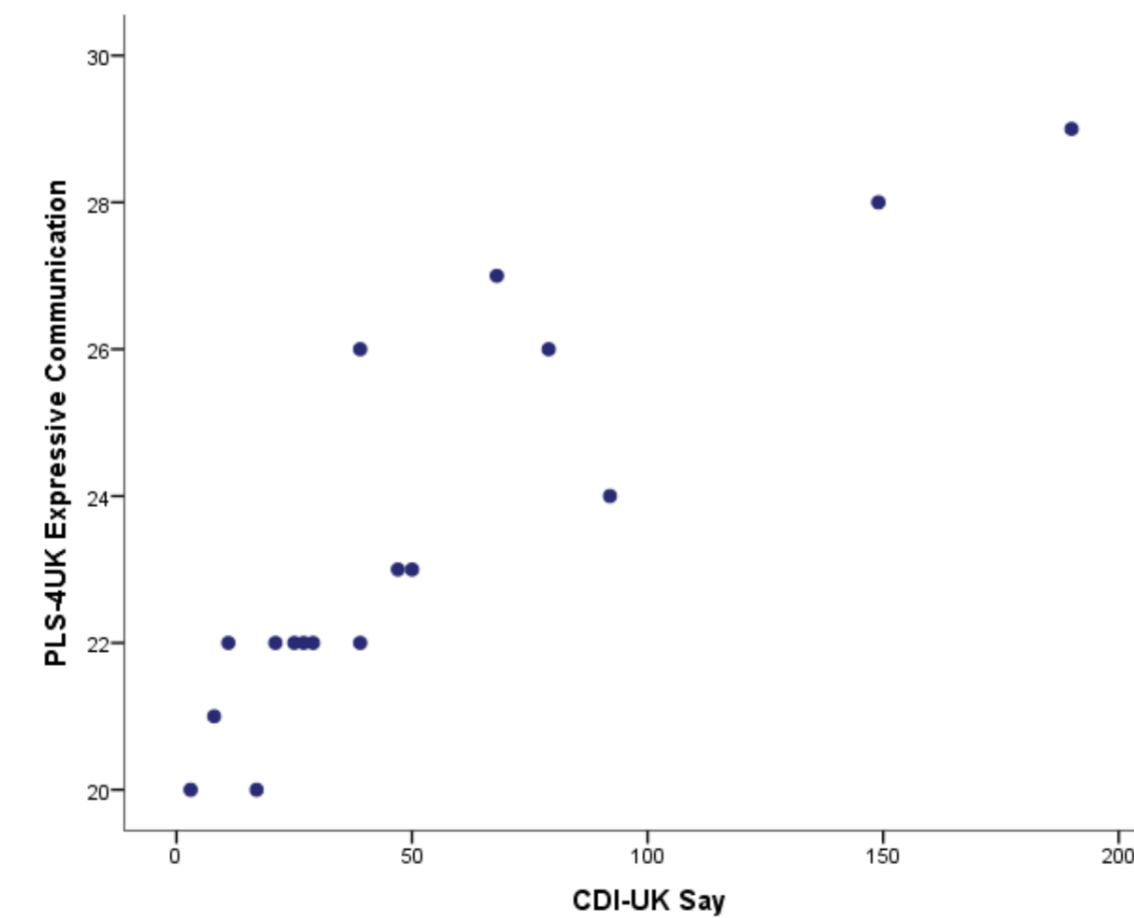


Fig. 4. Correlation between the expressive communication from the PLS-4UK and what parents say their child can say, from the UK-CDI.

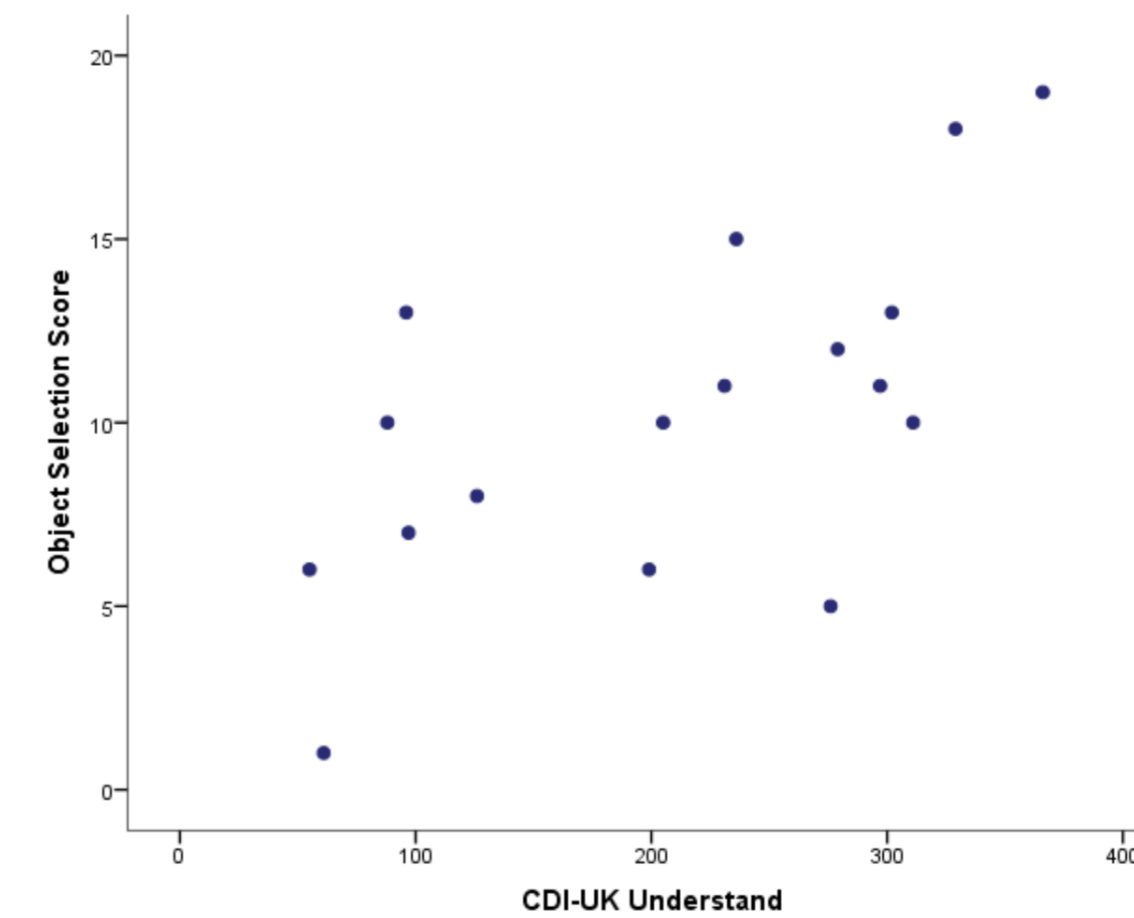


Fig. 5. Correlation between the object selection task and what parents say their child can understand, from the UK-CDI.

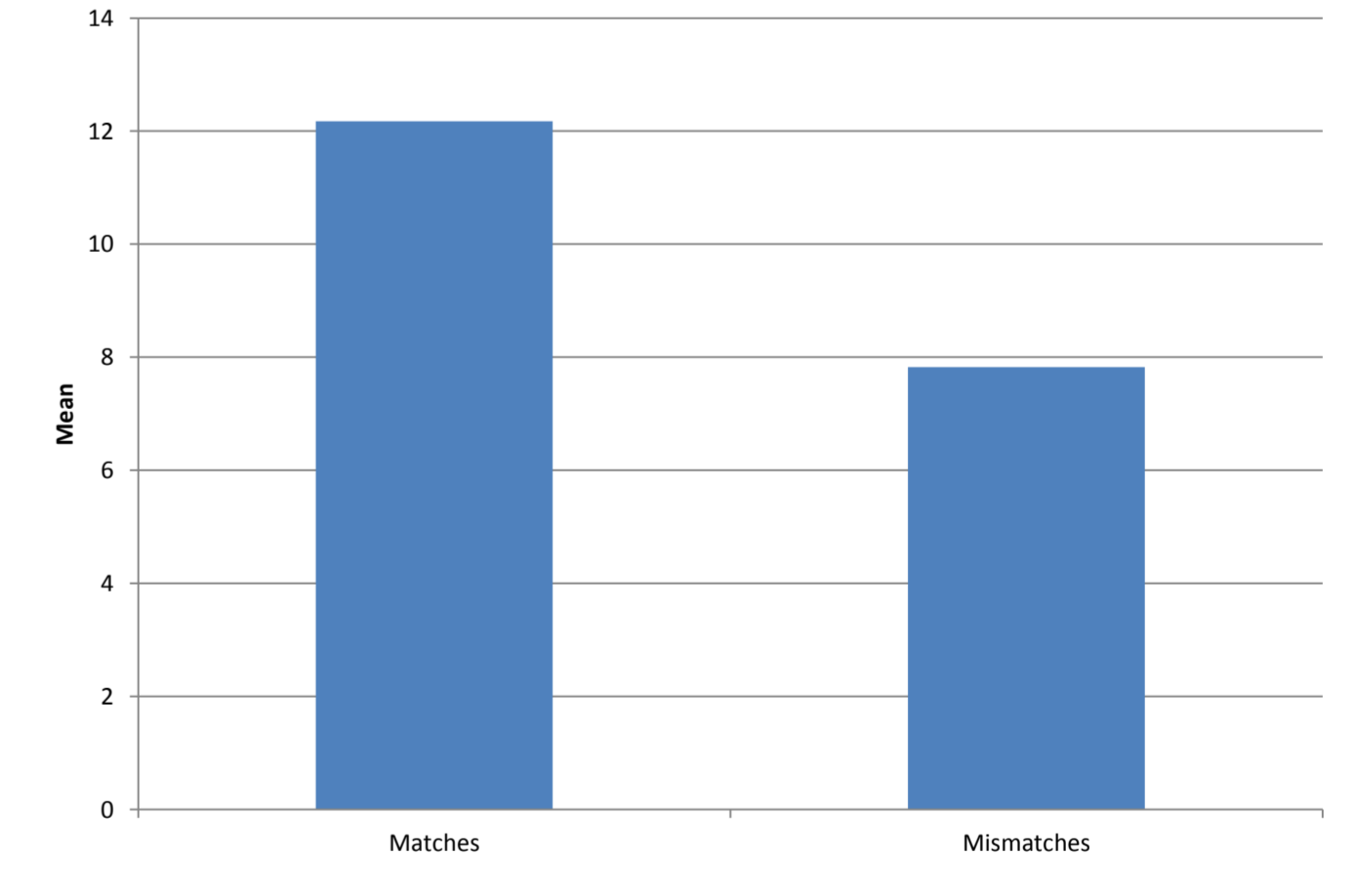


Fig. 6. The mean number of matches and mismatches between the object selection task and what parents say their child can understand, from the UK-CDI.

## Results and Discussion

A spearman's correlation analysis showed that there was a significant positive correlation between the PLS-4UK auditory comprehension and the 'understand' section of the UK-CDI,  $r_s(17) = .82$ ,  $p < .001$  (two-tailed). We also found a significant positive correlation between the PLS-4UK expressive communication and the 'says' section of the UK-CDI,  $r_s(17) = .92$ ,  $p < .001$  (two-tailed). In addition to this, a spearman's correlation analysis showed there was a significant positive correlation between the PLS-4UK auditory comprehension and the results from the object selection task,  $r_s(17) = .63$ ,  $p = .006$  (two-tailed). A t-test showed that on the object selection task, there were significantly more matches than would have occurred by chance,  $t(16) = 2.63$ ,  $p = .018$ .

It was found that parents were very accurate at recording whether their child can understand and say particular words. The more words that children knew and said according to a laboratory based measure (the Preschool Language Scale) and an object selection task, the more words parents recorded in the app. We conclude that the BabyTalk app has high criterion validity and is fit for purpose.

A focus group was held in order to discuss future development plans for the BabyTalk app. There will be a family questionnaire to record details of health and family background, the UK-CDI questionnaire which can be updated and used as a language diary, a daily diary with the opportunity to upload photographs and videos, a milestones diary, information bites which are pop-ups tuned to the child's language or age level, links to educational but fun websites, and lots more exciting features.

## References

- Blanden, J. (2006). *Bucking the trend: What enables those who are disadvantaged in childhood to succeed later in life?* London: Department of Work and Pensions  
 The Sutton Trust (2012). *Social mobility and education gaps in the four major Anglophone countries.* Report of the The Sutton Trust/Carnegie Social Mobility Summit held at the Royal Society.