



## The Natural History of Language Impairment: Parents, Predictors and Public Health

James Law  
Cristina McKean  
Newcastle University, UK

CRE week conference Melbourne - September 2015

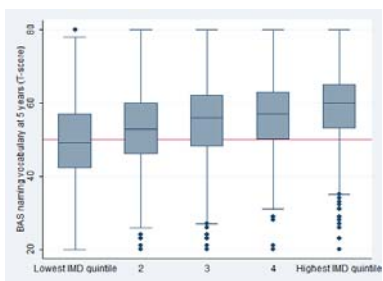
Partners:



## What we will be covering

- Engagement of parents and their understanding of need is critical to engagement with and thus implementation of a public health programme
- Predictive issues associated with clinical populations are amplified in population studies (needles and haystacks, wood and trees etc)

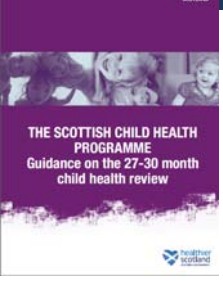

## Naming vocabulary at five years from The Millenium Cohort Study



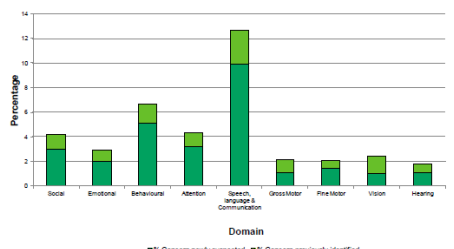
Law, J., Todd, E. Clark, J. Mroz, M. & Carr, J. (2013) *Early language delays in the UK* London: Save the Children Fund.

## Parents

cristina.mckean@ncl.ac.uk

### Figure 4: Percentage of newly suspected and previously identified concerns in Scotland by developmental domain: 2013/14



Source: ISD Scotland, CHSP Pre-School Aug 2014

### Single entities?

Table 2: Concerns about multiple developmental domains, 27 month review, Scotland, 2012/13

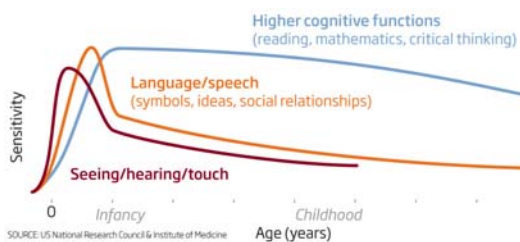
All children

Developmental domain	Children with new concern identified in the specified domain N	Children with new or previous concern in other domains N (%)				Children with previous concern in the specified domain or new or previous concern in any other domain N (%)
		SEBA	Speech & language	Gross or fine motor	Vision or hearing	
SEBA	3,062	-	1,852 (64.6)	501 (16.4)	450 (14.7)	1,851 (60.8)
Speech & language	4,204	1,500 (35.7)	-	535 (12.7)	528 (12.6)	1,858 (44.8)
Gross or fine motor	818	495 (59.9)	81 (10.0)	-	199 (24.4)	680 (79.2)
Vision or hearing	810	355 (43.8)	485 (59.4)	180 (22.2)	-	548 (67.7)

### BCRP - Some key messages from children and parents

- Children valued their family and friends, their pets and the people who help them. They valued the fun they have with teachers and family. They were proud of their achievements and had individual aspirations for the future. They acknowledged areas of difficulty which included their own feelings and emotions. Rarely did they spontaneously raise the issue of their own speech, language and communication skills;
- Parents valued development in the communication skills of their children because this was seen as the development that was needed to facilitate their child's independence, acceptance and inclusion. In the same way, academic skills in literacy and numeracy were seen as necessary to a child's ability to be independent, particularly economically;
- Parents would like to see an increase in knowledge about, and attitudes towards SLCN of those around them. This includes the general public, family and professionals they encountered;
- Children would like adults to listen more and not shout; they would like their peers not to tease them;
- A range of parent and self-report measures exist in the area of children's quality of life, although few have been used with children and young people with SLCN.

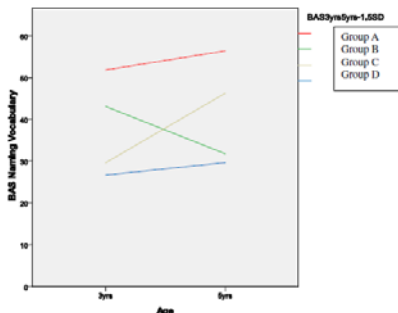
### Predictors



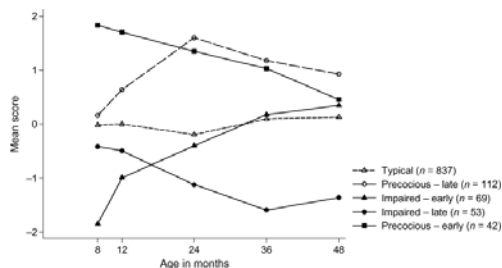
cristina.mckean@ncl.ac.uk

### Millenium Cohort Study Patterns of change on the BAS Naming vocabulary between 3 and 5 years (N=13016)

Group A, the Typical Language Group (n=12066) had scores within normal limits at both three and five years  
Group B was an increasingly Vulnerable Language Group (n=1377) had typical development at three years but languid delay by five years  
Group C was a Resilient Language Group (n=572) was language delayed at three years but developing typically by five years  
Group D was a Consistently Low Language Group (n=201) which had languid delay at three and five years.

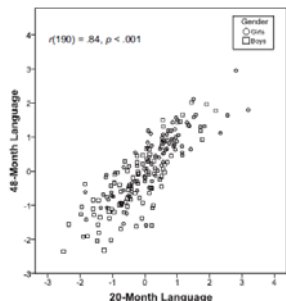


### 2. ELVS - Profiles of language development in pre-school children: a longitudinal latent class analysis of data from the (N=1113) (Ukoununne et al. 2012)



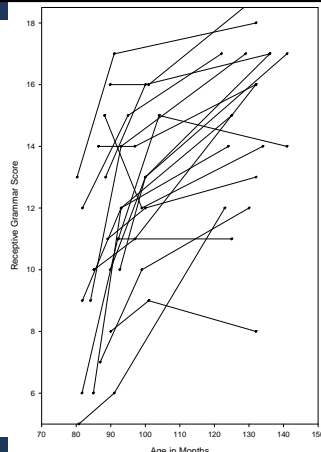
Child Care, Health and Development  
Volume 18 (2011), pages 341-349, 24 MAR 2011 DOI: 10.1111/j.1365-2214.2011.01234.x

3. Scatterplot of 20-month and 48-month language latent variable scores by child gender (Bornstein et al.2012)

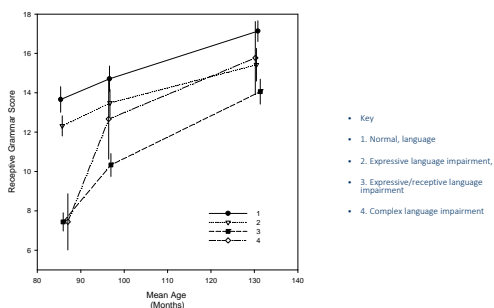


3i. Conti-Ramsden Manchester Language Study (N=242) (Law et al.2008)

Receptive grammar scores between 7,8 and 11 years [Manchester SLI cohort]



3ii. Trajectories for four key groups



Oral language as an issue of social equity

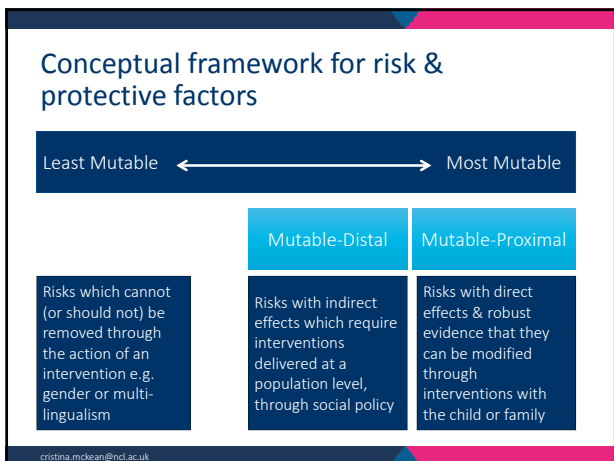
Millenium Cohort Children

	Months of development ahead or behind the average at 3 subsequent ages		
	At five years (vocabulary)	At seven years (single word reading)	At eleven years (verbal similarities)
"School readiness" – Bracken at 3 years			
Delayed (bottom 10%)	-13.9	-9.8	-14.1
Advanced (top 20%)	8.0	8.4	9.5
Very Advanced (top 5%)	13.0	16.4	17.0

Long term outcomes

- Lots of studies have looked at change over time for children with identified difficulties
- The BCS70 allowed us to follow 11,000 children with both specific and more general language difficulties between 5 and 34 years and compare them with their typically developing peers (once developmental and socio-demographic factors had been taken into consideration).

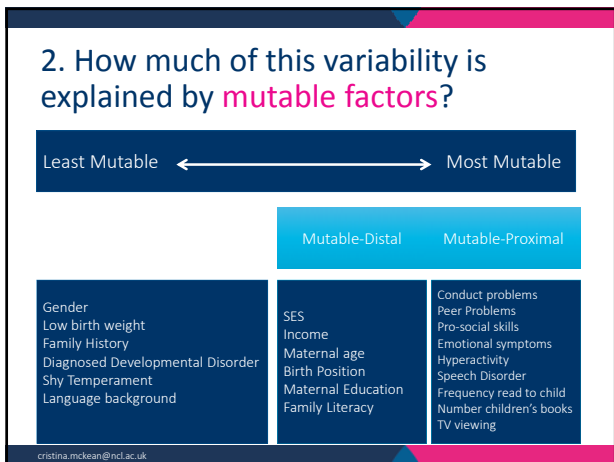
	Increased odds relative to typically developing group	
	General language difficulties	Specific language difficulties
Literacy	4.35***	1.59**
Mental health	2.9**	1.5
Employment	1.88*	2.2***



### Sample

- ELVS cohort
- Children with complete language test data at 4, 5 and 7 years (N=883)
- Scaled score from the CELF P2 and CELF 4 core language score
- mean = 0 SD = 1
- Unit of measurement for intercept = 1 SD
- Unit of measurement for slope = number of SD per year

cristina.mckean@ncl.ac.uk



### 2. How much of this variability is explained by mutable factors?

Factors	Pseudo R squared	
	Intercept	Slope
Least Mutable	.34	.40
Mutable-Distal	.43 (+9)	.44 (+4)
Mutable-Proximal	.48 (+5)	.67 (+23)

cristina.mckean@ncl.ac.uk

### 3. Levers for language growth? - least mutable

Factors	Adjusted Coefficient [95% CI]	
	Intercept	Slope
<b>Gender</b>		
Male	-.09 [-.20, .02]	.00 [-.03, .03]
<b>Birth weight</b>		
Low (<2500g)	-.02 [-.30, .26]	-.09* [-.16, -.01]
<b>Non-verbal IQ (highest)</b>		
Q2	-.07 [-.25, .11]	-.04 [-.09, .01]
Q3	-.27** [-.47, -.08]	-.01 [-.06, .05]
Q4	-.46*** [-.65, -.27]	-.03 [-.08, .03]
Q5 (lowest)	-.78*** [-.98, -.59]	.04 [-.02, .09]
<b>Family history</b>		
Positive family history	-.14* [-.27, .01]	.01 [-.03, .04]
<b>Developmental disorder</b>		
Diagnosed developmental disorder	-.52*** [-.74, -.30]	.03 [-.09, .04]
<b>Approach-withdrawal</b>		
'Shy'	-.22** [-.36, -.09]	.03 [-.01, .07]
<b>Language background</b>		
Non-English Speaking Background	-1.03*** [-1.5, -.57]	.43*** [.31, .56]

Spic 1: \*p<.05; \*\*p<.01; \*\*\*p<.001

cristina.mckean@ncl.ac.uk

### 3. Levers for language growth? - mutable-distal

Factors	Adjusted Coefficient [95% CI]	
	Intercept	Slope
<b>SES (highest)</b>		
Q2	-0.10§ [-.23, .02]	.01 [-.02, .05]
Q3	-.23* [-.44, -.03]	.02 [-.04, .08]
Q4	.04 [-.20, .29]	-.01 [-.08, .05]
Q5 (lowest)	-.26§ [-.53, .00]	.05 [-.02, .12]
<b>Income</b>		
Holds Healthcare card	-0.18* [-.34, -.01]	-.00 [-.05, .04]
<b>Maternal Age (Ref &gt;24 years)</b>		
Young Mother (<25 years)	.11 [-.43, .21]	.03 [-.06, .12]
<b>Birth Position</b>		
High birth Position (3 <sup>rd</sup> - 5 <sup>th</sup> )	-.27** [-.43, -.11]	.02 [-.02, .06]
<b>Maternal Education (Ref: ≥ year 12)</b>		
Low Maternal Education (< year 12)	-.08 [-.22, .06]	.02 [-.02, .06]
<b>Family Literacy (highest)</b>		
Q2	.25** [-.42, .08]	.02 [-.07, .02]
Q3	.33*** [-.50, .17]	.02 [-.03, .06]
Q4	.27*** [-.44, .10]	.03 [-.08, .02]
Q5 (lowest)	.44*** [-.62, .26]	.01 [-.06, .04]

Spic 1: \*p<.05; \*\*p<.01; \*\*\*p<.001

cristina.mckean@ncl.ac.uk

### 3. Levers for language growth? - mutable-proximal [child factors]

Factors	Adjusted Coefficient [95% CI]	
	Intercept	slope
<b>Child Factors</b>		
Conduct score		
Conduct problems	.04 [-.16, .24]	-.04[-.10, .02]
Peer score		
Peer problems	-.12 [-.31, .07]	.04 [-.02, .09]
<b>Pro-social score</b>		
Low pro-social score	-.23§ [-.45, .01]	.07* [.00, .13]
<b>Emotional score</b>		
Emotional problems	.20 [-.05, .43]	-.00 [-.07, .07]
<b>Hyperactivity/inattention</b>		
Hyperactivity/inattention problems	-.09 [-.30, .12]	-.04 [-.10, .02]
<b>Speech development</b>		
Speech Sound Disorder	-.26§ [-.51, .00]	.04 [-.03, .11]

§p<.1, \*p<.05, \*\*p<.01, \*\*\*p<.001.

cristina.mckean@ncl.ac.uk

### 3. Levers for language growth? - mutable-proximal [family factors]

Factors	Adjusted Coefficient [95% CI]	
	Intercept	Slope
<b>Family factors</b>		
<b>Frequency reading to child (highest)</b>		
Q2	-.15§ [-.30, .01]	.05* [.01, .10]
Q3	-.21** [-.35, -.06]	.05** [.01, .10]
Q4 (lowest)	-.38*** [-.56, -.21]	.02 [-.03, .07]
<b>Number of children's books in the home (&gt;30)</b>		
20-30	-.20** [-.35, -.05]	.02 [-.02, .07]
10-20	-.32** [-.49, -.14]	-.02 [-.08, .04]
<10	-.58* [-1.04, -.12]	.11§ [-.02, .24]
<b>TV viewing per day (lowest)</b>		
Q2	-0.08 [-.22, .06]	-.03§ [-.07, .01]
Q3	-0.09 [-.26, .06]	-.04§ [-.08, .01]
Q4	-0.11 [-.29, .07]	-.07** [-.13, -.03]

§p<.1, \*p<.05, \*\*p<.01, \*\*\*p<.001.

5% sample both these risks

cristina.mckean@ncl.ac.uk

## Conclusions



- A substantial proportion of the variance in both language at 4 and language growth between 4 and 7 is explained by the factors that are least amenable to change
- However substantial change can still occur in children's language growth from 4 to 7 and much of this growth is associated with mutable factors..
- The significant and cumulative effects of, shared book reading, books in the home and TV viewing, point to the promotion of a set of parenting behaviours which could bolster language and literacy development, **all of which have proven to be modifiable through interventions..**
- A family's resource, in terms of its **material and cultural capital**, has a large influence on language development **up to the age of 4 years**, and must not be ignored in the design of interventions.
- The direction of causality is, of course, moot, however **there is the potential that combining interventions for these environmental factors with more traditional, language-focussed approaches could increase the effectiveness of services for children with poor language development.**

cristina.mckean@ncl.ac.uk

- But is earlier always better?

## But .. assumptions need testing

- Problems with reliable prediction
- Who is in the sample?
- Time of austerity
- No services to children in secondary school
- What IS the outcome?
- And what is the optimum age to respond to intervention?
- Norberry, C. (2015) Editorial: Early intervention in response to language delays – is there a danger of putting too many eggs in the wrong basket? *Journal of Child Psychology and Psychiatry* 56:8 835-836

## “The myth of the first three years” (Bruer 1999)

- Beware of absolute categorical statements “critical periods..are not windows that slam shut.” p.199
- “The first three years are not the ONLY years we have to build better brains. The brain is not cooked by age 3 or age 10.”
- Be sensitive to overgeneralisation (and rhetoric) relevance of Huberl and Wiesel's blind kittens or rodents to HeadStart
- Beware enriched environments that reflect our own cultural niche
- Eschew genetic determinism
- The myth can weaken our resolve to aid older citizens
- “Brain science even if we add in behavioural science cannot tell us how to raise a scientifically correct child”
- The bell curve is a curve ball (Clinton) not only unscientific but insidious
- Bruer,J.T. *The myth of the first three years: A new understanding of early brain development and lifelong learning* New York: The Free Press.

## In summary

Public health approach assume:-

- clear indicators of social disparities
- good population knowledge and understanding of natural history
- Clear sense of what is the desired outcome
- good data on population level interventions but also need for a better understanding of targeting (social marketing)