



The role of phonological deficits in reading impairments among prison inmates in Norway.

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In collaboration with

- **County Governor in Hordaland County**
 - Torfinn Langelid

Today's message:

- Background
- Pilot study of reading habits and reading problems among the inmates in Bergen – preparation for a national survey
 - Methodological considerations
 - Some temporary results
 - An attempt to conclude

- White paper nr 27, 2004-2005:
Om opplæringen i
kriminalomsorgen. “En ny vår...”
 - Education as an important approach
to recidivism prevention and
rehabilitation
 - Need to assess impairments in
reading, spelling and mathematics
among prison inmates in Norway
 - Increase the correspondence
between inmates skills and abilities
and content of programs in prison
education
- Collaboration with County
Governor of Hordaland County
and Bergen Prison/KROM

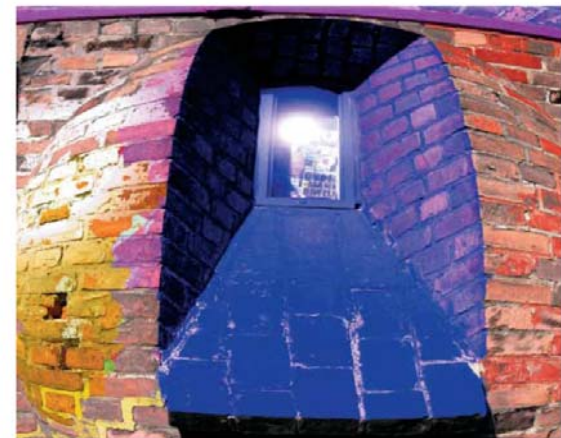


St.meld. nr. 27

(2004–2005)

Om opplæringen innenfor kriminalomsorgen

“Enda en vår”





- ***Literacy***
 - Reading and writing at a level adequate for communication or at a level that enables one to successfully comprehend and communicate in society
- ***Reading impairments***
 - Impaired reading skills that could be attributed to a variety of factors
 - General reading impairments
- ***Dyslexia***
 - Problematic concept, with differing content
 - Impaired reading due to impaired phonological skills?
 - Or: caused by a specific impairment in phonological skills?

But: What is Dyslexia?



- Developmental disorder with brain basis
- Genetic origin
- Characterised by phonological deficits
- Primarily (but not exclusively) affects learning to read and spell
- Characterised by poor verbal memory and poor phonological learning
- Often affects development of arithmetic skills, foreign language learning, speech development, expressive language skills
- May have knock-on effects on organisational skills and on confidence and self-esteem
- Typically shows poor response to standard forms of literacy teaching
- Life long condition but can be ameliorated

Snowling, 2005

Impaired reading skills are frequently reported among the inmates across countries



- Seventy per cent of prison inmates in Sweden have impaired reading skills

Samuelsson et al, (2000)

- Eighty per cent of the inmates in Texas showed impaired reading skills

Moody et al (2000)

- Fifty-seven of a sample of young offenders had significantly poorer literacy skills than was predicted from their non-verbal intelligence, 43% had significantly poorer literacy skills than predicted from their verbal intelligence

Snowling et al (2000)

- Seventy percent of the inmates participating in the IALS survey in Ireland had scores on pre-level and level 1-2

Morgan & Kett (2003)

A varying number of inmates have dyslexia?



- Eighty per cent of the inmates in a study from Texas had impaired reading skills – 47.5 % had problems with word attack skills.

Moody et al (2000)

- Thirty-eight per cent had specific phonological deficits. When those with nonverbal IQ less than 85 were excluded, only 8% met the criteria for dyslexia

Snowling et al (2000)

- Fifty per cent of the juvenile offenders in Scotland showed signs of dyslexia.

Kirk and Reid (2001)

- Seventy per cent of the inmates showed impaired reading skills - only a small fraction of the inmates with dyslexia (11%).

Samuelsson et al (2003)

- 31 % of a unselected sample of 62 juvenile offenders aged 15-17 years showed signs of dyslexia, 32% showed borderline symptoms, showing some literacy problems although these are probably unlikely to be due to dyslexia.

British Dyslexia Association (2005)

Is there a relation between reading skills and type of offence?



TABLE 4.5: TYPE OF OFFENCE AND LITERACY LEVEL

	Pre-Level 1	Level 1/ 2	Level 3/4/5
Violent offences	23.6	50.0	26.4
Property offences	28.3	54.6	17.8
Drug offences	8.1	35.1	56.7
Sexual Offences	14.7	35.3	50.0
Other offences	24.4	51.1	24.4

Morgan & Kett, The prison adult literacy survey, 2003

Is this related to the problem of "early starters"? Cf. Moffit et al, 2001

So what about Norway?



- Few systematic studies of inmates' reading skills
- National survey of prison education
 - One third of the inmates reported reading problems
 - One out of five of those participating in prison education stated their reading problems determined their choice of educational program

Eikeland & Manger (2004)

Method

Participants, Test Material, and Procedures

Who participated



- All together 93 inmates from Bergen prison
 - 71 participated in the reading test
 - 63 participated in both the survey and the reading test
 - 4 participated in the reading test but did not fill out the questionnaire
- Gender distribution
 - 90.3 % males.
 - 5.4 % females.
 - 4.3 % did not report gender
- Age distribution
 - Males: Average 32.8 years. $sd = 9.6$
 - Females 35.6 years. $sd = 13.0$
- Adequate knowledge of Norwegian

“Crime and Punishment”



Type of crime	Duration of incarceration			
	>3 months	3-12 months	1-5 years	>5 years
Sexual offences			11	1
Violent offences		5	14	5
Drug offences		4	12	6
Property offences	1		3	1
Other offences		1		
All Groups	1	10	40	13

Distribution of the participants over duration of incarceration separate for the different categories of criminal offence

In addition, 23 participants were held on remand and were not convicted.

Level of Education Among the Participants



- 7.3 % had not completed any education
- 21.5 % completed primary education (9th or 10th grade)
- 53.8 % had completed at least one year of secondary education
- 9.7 % reported higher education (single courses or degree from university/college).
- Compared to the general population, this is about one generation behind

What we did:



- **Informed consent**
- **Questionnaire, covering**
 - Background information
 - Present and former education
 - Self-report of reading/spelling/mathematics skills and history
 - Reading habits
 - SHC: Subjective Health Complaints (Eriksen et al, 1999)
 - WURS: Early ADHD-symptoms (Ward et al, .1993)
 - PLCS: Prison Locus of Control Scale (Pugh, 1998).
 - Self-efficacy for reading, spelling and mathematics (Shell, Colvin & Bruning, 1995)
- **Standardised reading test**

Strømsø, Hagtvet, Lyster. & Rygvold. (1997). *Lese- og skriveprøve for studenter på høyskole- og universitetsnivå. [Reading and Spelling test for students at university and college level]*. Oslo: Institutt for spesialpedagogikk, Universitetet i Oslo.

 - Nonsense word reading
 - Word chains
 - Silent reading speed
 - Reading comprehension
 - Spelling
 - Proof reading

Test of Basic Reading Skills



- Reading speed, silent reading
- Reading comprehension
- Word recognition
 - Word Chain Test
 - “Find the hidden words”: etter|kart|møte
- Phonological skills
 - Nonsense Word Reading
 - What “word” sounds like a real word?
sdurke sbarke skerke sberke

Individual assessment in a subsample



- N= 28
- All males
- Mean age 30.25 years
 - sd = 9.05
 - Range = 18-51 years
- Voluntary participation

Tests of basic cognitive skills



- Language laterality
 - Dichotic listening with CV-syllables
- Executive functions and attention
 - DL with forced attention
 - Continuous Performance Test, CPT
 - Stroop Colour Word Test :
 - BLUE GREEN YELLOW RED
- Working memory
 - Paced Auditory Serial Addition Test: PASAT
 - California Verbal Learning Test, CVLT
- Rapid naming
 - FAS (name objects starting with the letters F, A and S)
 - Also part 1 and 2 of Stroop

Temporary results from Bergen prison

How do they present them selves?



Self-Reported Skills

		Incarceration	
		Convicted	On remand
Reading skills	Very weak/weak	9.5 %	20.4 %
	Average or better	90.5 %	79.6%
Spelling skills	Very weak/weak	14.3 %	20.4 %
	Average or better	88.9 %	87%
Math skills	Very weak/weak	29.7 %	38.2 %
	Average or better	73.4%	80,9 %

Self-Reported Reading Deficits



		Incarceration	
		Convicted	On remand
Reading problems	No, not at all	52.3 %	43.5 %
	Yes (to an extent)	47.8 %	56.6 %
Spelling problems	No, not at all	37.5 %	26.1 %
	Yes (to an extent)	62.5 %	73.9 %
Math problems	No. not at all	38.5 %	34.8 %
	Yes (to an extent)	61.6 %	62.2 %

Reading Test Performance



	Valid n	Mean	SD
Reading speed. (words per minute)	70	206.2	83.2
Reading comprehension	70	7.2	3.2
Proof reading (number of errors detected)	70	10.6	7.0
Word chains (max = 120)	71	40.3	14.4
Nonsense word reading (max = 38)	70	14.9	9.5
Spelling (max = 44)	68	28.6	9.4

Reading speed: How fast is fast?



Words per minute	Description
< 170	Very slow
170 – 225	Slow
225 – 275	Average
275 – 400	Fast
> 400	Very fast

Estimates based on prose reading

Distribution of participants over Stanine scores



Stanine scores

	1-2	3-7	8-9
Proof reading	67.4 %	25.3 %	1.4 %
Spelling	75.9 %	15.5 %	4.2 %
Word chains	57.8 %	33.7 %	8.5 %
Nonsens words	44.9 %	33.8 %	2.9 %

Based on norms for young adults

Significant correlations between self-reported and measured reading skills



	SR reading	SR spelling
Wordchains	-.19	-.30*
Nonsensewords	-.48*	-.55*
Spelling	-.28*	-.44*
Reading speed	-.38*	-.33*
Reading comp.	-.33*	-.26*
Proof reading	-.46*	-.53*

Rasmussen, Forland, & Asbjørnsen, unpublished

So: how many are dyslexics?



- Our test procedure includes four indicators of dyslexia:
 - Phonological processing
 - Word recognition
 - Spelling
 - Orthographic pattern recognition

Distribution of participants based on impaired indicators:

	Four	Three	Two	One	None	Phon
%	27	25	23	11	12	2

Self-reports of skills and clinical signs



		n	Mean	sd	Norms
Self-reported skills	Reading	27	3.7	1.0	
	Spelling	27	3.5	1.0	
	Mathematics	27	2.9	1.0	
Self-reported ADHD-symptoms	WURS25	28	45.1	8.0	36
Subjective Health Complaints	SHC	28	15.5	1.0	12
Locus of control*	PLCS	28	101.0	59.0	150

**150 represents the split between internal and external groups*

Basic cognitive skills



			Mean	sd	Norms	
Sustained attention	CPTci	28	53.2	21.7		
Rapid naming	FAS	28	32.3	13.6	43.5	9.4
Symbol search (SS=9)	WAIS-SS	28	30.6	7.2	33	10.0
Vocabulary (SS=8)	WAIS-VO	28	31.8	12.1	42.5	14.0
Similarities (SS = 10)	WAIS-SI	27	14.9	5.2	23.5	7.0
Verbal Working Memory	PASAT3	26	45.1	13.2	41.8	6.5
	PASAT2	24	40.9	10.0	37.8	7.5
Automatic processing	STROOPCWR	28	32.6	6.6	24.9	4.2
	STROOPCN	28	20.1	4.1	16.0	2.6
	STROOPWCN	28	55.3	12.6	43.2	9.1
Language laterality	DLNFRE	28	47.3	4,7	46.0	10.7
	DLNFLE	28	32.4	4,2	35.8	10.2
	DLFRRE	28	61.2	5,8	51.3	14.2
	DLFRLE	28	26.1	5,0	27.3	10.0
	DLFLRE	28	45.8	4,7	34.8	12.5
	DLFLLE	28	37.0	4,9	44.9	15.6

Reading skills



	n	Mean	Sd	Norm	
Reading speed	26	203.9	15.3	250	
Reading speed, reading loud	28	129.8	28.0	120.7	
Word recognition (Stanine score)	27	2.9	0.4	4-6	
Non-word decoding (Stanine Score)	27	2.9	0.5	4-6	
Spelling (Stanine score)	26	2.1	0.3	4-6	
Reading comprehension	27	6.7	0.5		
Author recognition	27	11.4	1.3	16.1	5.8
Nonword decoding (loud)	27	66.4	4.1	100.6	34.9
Single word decoding (loud)	27	36.8	3.0	46.6	20.2

Reading habits



- 50 % of the participants report use of the library during incarceration (27 % in freedom)
- 61 % report to have books in possession during incarceration (50 % have books at home)
- 73 % report daily newspaper reading during incarceration
- 27.5 % report reading novels weekly or more often (13 % in freedom)
- Half of the participants have never borrowed a book from the library (the other half have borrowed on the average one book per week)

What can predict the self-report of reading?



- Spelling and reading comprehension is the most influential variables
- Variables with high face validity for reading
- This also represents areas where it is easy to be aware of own skills

	Beta	Std.Err.	B	Std.Err.	t(60)	p-level
Intercept			1.59	0.30	5.35	.000
Spelling	0.45	0.12	0.05	0.01	3.68	.000
Reading Comprehension	0.29	0.12	0.10	0.04	2.41	.019

R= .67 R²= .45 Adjusted R²= .43 F(2,60)=24.05; p < .001

Word decoding skills



- Word decoding skills were measured with single word reading
- Word decoding in adult readers were best predicted from a combination of Word recognition, Reading comprehension and Phonological skills
- However, these variables explained only 25 % of the variance, 75 % remains unexplained

	Beta	Std.Err.	B	Std.Err.	t(21)	p-level
Intercept			13.44	14.15	0.95	.35
Wordchains	0.21	0.25	0.34	0.42	0.82	.42
Reading comprehension	0.26	0.23	2.59	2.31	1.13	.27
Nonsense word reading	0.24	0.22	0.59	0.54	1.11	.28

R= .60 R²= .35; Adjusted R²= .25; F(3,21)=3.70, p < .05

What can predict the phonological skills?



- Nonsense word reading is reflecting phonological skills
- Phonological skills are related to rapid naming and working memory capacity
- These are variables that have been found to be important for reading acquisition
- We have less information on how they influence reading skills in adults

	Beta	Std.Err.	B	Std.Err.	t(19)	p-level
Intercept			-8.56	6.63	-1.29	.212
Rapid naming: FAS	0.54	0.17	0.38	0.12	3.28	.004
Working memory: PASAT	0.35	0.17	0.33	0.16	2.10	.050

R= .72 R²= .52 Adjusted R²= .47 F(2.19)=10.46 p < .001

To summarize:



- Reading skills were on the average impaired among the inmates compared to the age equivalent population
- Impaired phonological skills were more common than expected
- Overrating of reading skills are quite common (as in the rest of the population), but reading and spelling self-concept is based on the experience of spelling and reading comprehension
- Phonological skills play a minor role for understanding reading skills among adults, at least in a transparent orthography
- Rapid naming and working memory play an important role for phonological skills in adult readers
- A combination of working memory, rapid naming, reading comprehension and phonological skills can partly account for the variance in word decoding skills
- Increased risk for ADHD and similar problems,
 - but no systematic findings of impaired cognitive functions

Attempts to conclude



- The average participant had reading skills as an average 8th grader
 - But more participants than expected had also problems with basic reading skills
- Half of the participants are frequent readers
- Increased risk for ADHD and subjective health complaints,
 - but no systematic findings of impaired cognitive functions
- Large potential for further work on reading habits and strengthening of skills
- But are they dyslexic, and does it matter?

Abstract



- Education is considered important for rehabilitation among prison inmates, and reading skills are expected to be important for the success-rate in education. Increased prevalence of reading impairments are reported among prison inmates, but the impairment seems to be related to experiential, not constitutional factors. However, the role of phonological deficits in adult reading impairments in different orthographies is rarely addressed in research. Earlier studies indicates that transparency of orthography may play a crucial role for the prevalence of dyslexia in adults
- *Method:* A sample of 93 inmates in Bergen Prison, Norway, volunteered to answer a questionnaire focusing on reading skills and reading habits, and 71 participated in a standardized reading test assessing variables of importance to the reading development.
- *Result:* The average reading speed was typical for the 8th grade Norwegian student, which is below what was expected. Half of the participants showed impaired scores on a test of word recognition and more than 40 percent also showed impaired phonological skills.
- *Conclusion:* The prevalence of impaired reading was compatible with what has been reported from similar studies on prison inmates in Sweden and the USA, but the reported prevalence of phonological impairments differs largely between the countries.

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