Nasjonalt senter for leseopplæring og leseforskning
Universitetet i Stavanger

Camilla Fitjar, universitetslektor og PhD-student

Håndskrift – mer enn bare motorikk

Nasjonal konferanse om lesing 2024

DIGIHAND

HØGSKULEN I VOLDA

Nasjonalt lesesenter
Universitetet i Stavanger

Forskningsrådet

33 skoler

1.-2. klasse

Nynorsk

- Kun digitalt
- Kun håndskrift
- Jatakk begge deler

Nordic Journal of Literacy Research
Vol. 6 | No. 2 | 2020 | pp. 25–41

Protocol

Study protocol: DigiHand – the emergence of handwriting skills in digital classooms

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[1]*Volda University College and* [2]*University of Stavanger*

Abstract
This protocol article presents the project "DigiHand: The emergence of handwriting skills in digital classrooms."[1] The project is a longitudinal natural experiment investigating how the use of different writing tools influences students' handwriting and letter knowledge, word reading, spelling, written narrative composition and teacher–student interactions in Grades 1 and 2 (students aged 6 years in Grade 1). Participants are 33 schools (n = 585 students) representing three occurring conditions for learning writing skills in early years. Students in these conditions either (1) learn to write on a tablet while postponing handwriting, (2) learn both to handwrite and write on a tablet or (3) learn to handwrite. Effect analyses are conducted on four main domains of measures: (i) students' letter knowledge, spelling competence and word reading competence; (ii) students' handwriting fluency; (iii) students' ability to write narrative compositions; (iv) quality of teacher–student interactions. This protocol describes the background, design and pre- and outcome measures for the research project.

Keywords: *Handwriting vs. digital writing; postponing handwriting; tablets; teacher–*

Hva jeg *ikke* kommer til å snakke om:

- Framtidens skrivemodaliteter
- Hvorvidt barn lærer bedre med blyant eller tastatur
- Tekstproduksjon

Hva jeg skal snakke om

- Om ulike typer motoriske ferdigheter i bokstavforming

- Faktorer som bidrar til flyt i bokstavformingen hos førsteklassinger når de kopierer kjente og ukjente bokstaver – en studie fra min doktorgrad

Å lære å skrive bokstaver for hånd handler om å:

koble fonemer til grafemer

skille de ulike grafemene fra hverandre

ha en abstrakt motorplan for kjente bokstaver

utføre en motorplan for kjente bokstaver med en bestemt hånd

Kognitivt

Motor

Hva er motoriske ferdigheter i håndskrift?

Grovmotor
sittestilling
holdning

Finmotor
håndledd,
albue,
skulder

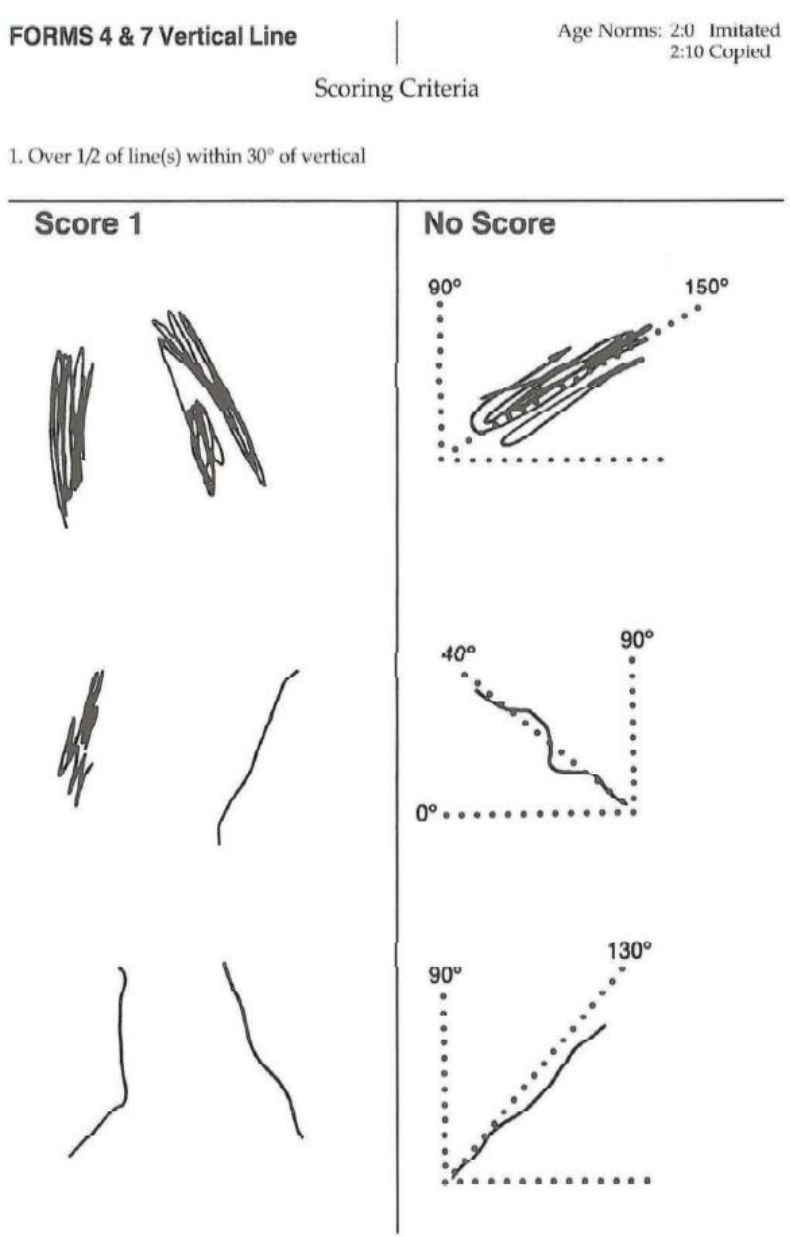
Oculomotor
øyemuskulatur,
visuell persepsjon,
visuomotor modning

Erhardt & Meade (2005)

Evnen til å tre perler på en snor predikerer ikke avkodingsferdigheter hos førskolebarn, men det gjør evnen til å kopiere greske bokstaver (Suggate et al. 2016)

Visuomotor integrering

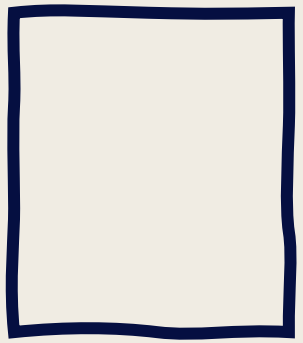
- **Visuell persepsjon**
  Kunne identifisere like objekter
- **Motorkoordinering**
  Flytte pennen fra punkt til punkt
- **Visuomotor integrering:**
  Flytte pennen intensjonelt fra et punkt til et annet for å *kopiere* en figur
- Beery-Buktenica Developmental Test of Visual-Motor Integration (Beery & Beery, 2010)
- Predikerer lesbarhet når 3.-5. klassinger på Taiwan kopierte en tekst (Tseng & Murray, 1994).

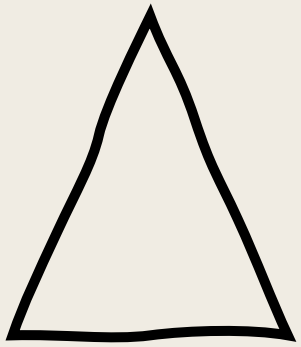


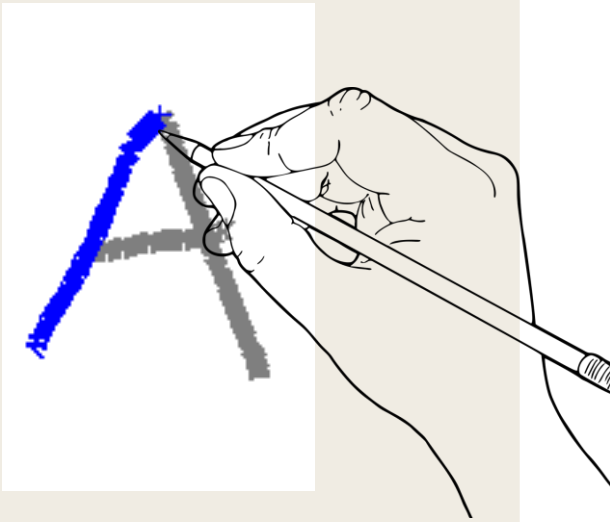
Grafomotoriske ferdigheter

Grafem (bokstav) + motor

Bokstaver vs geometriske figurer

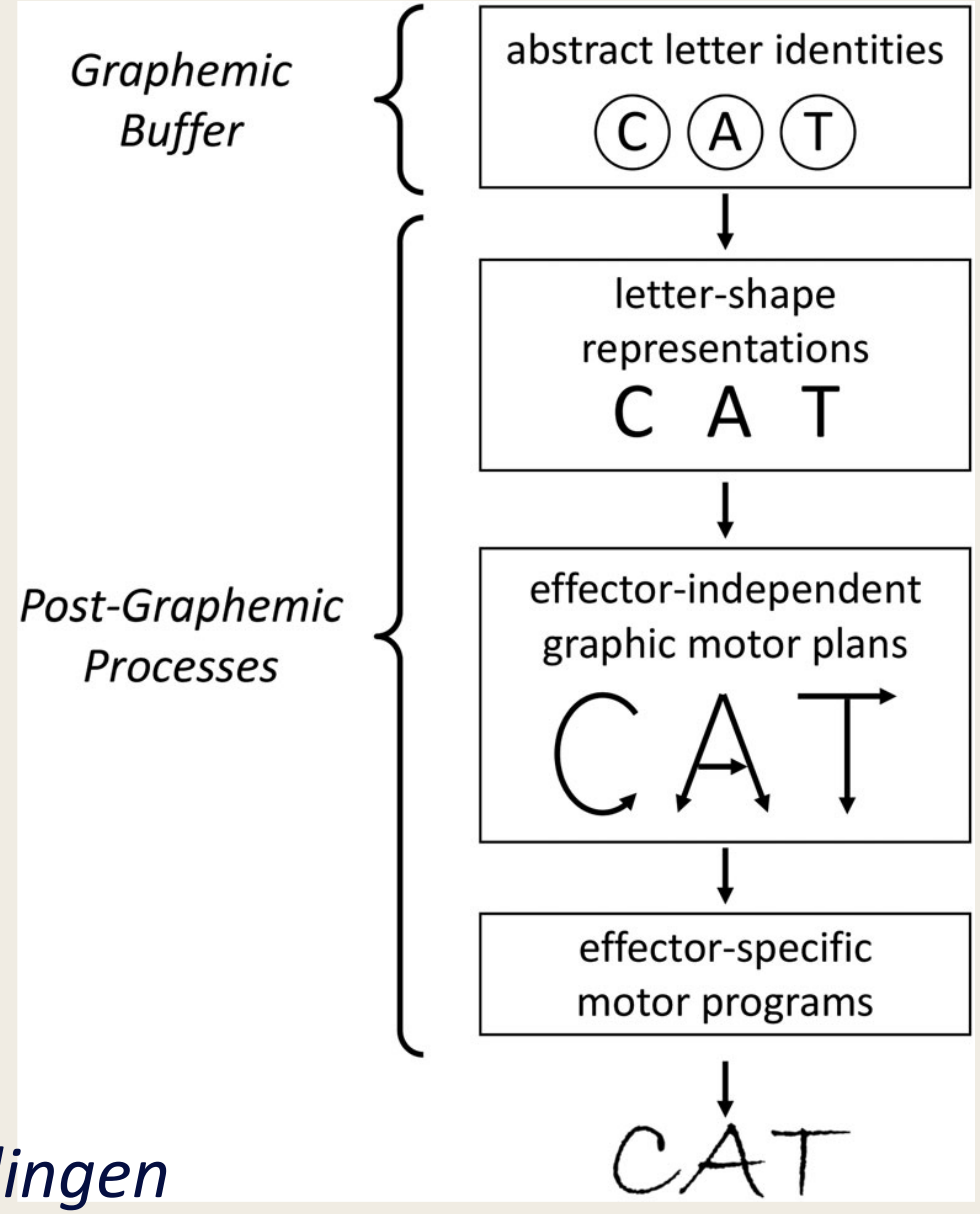






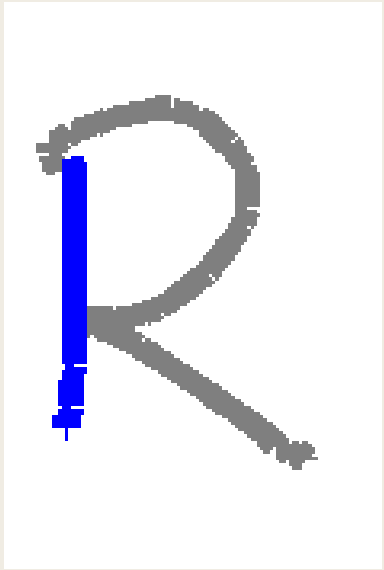
Fra tanke til skrift

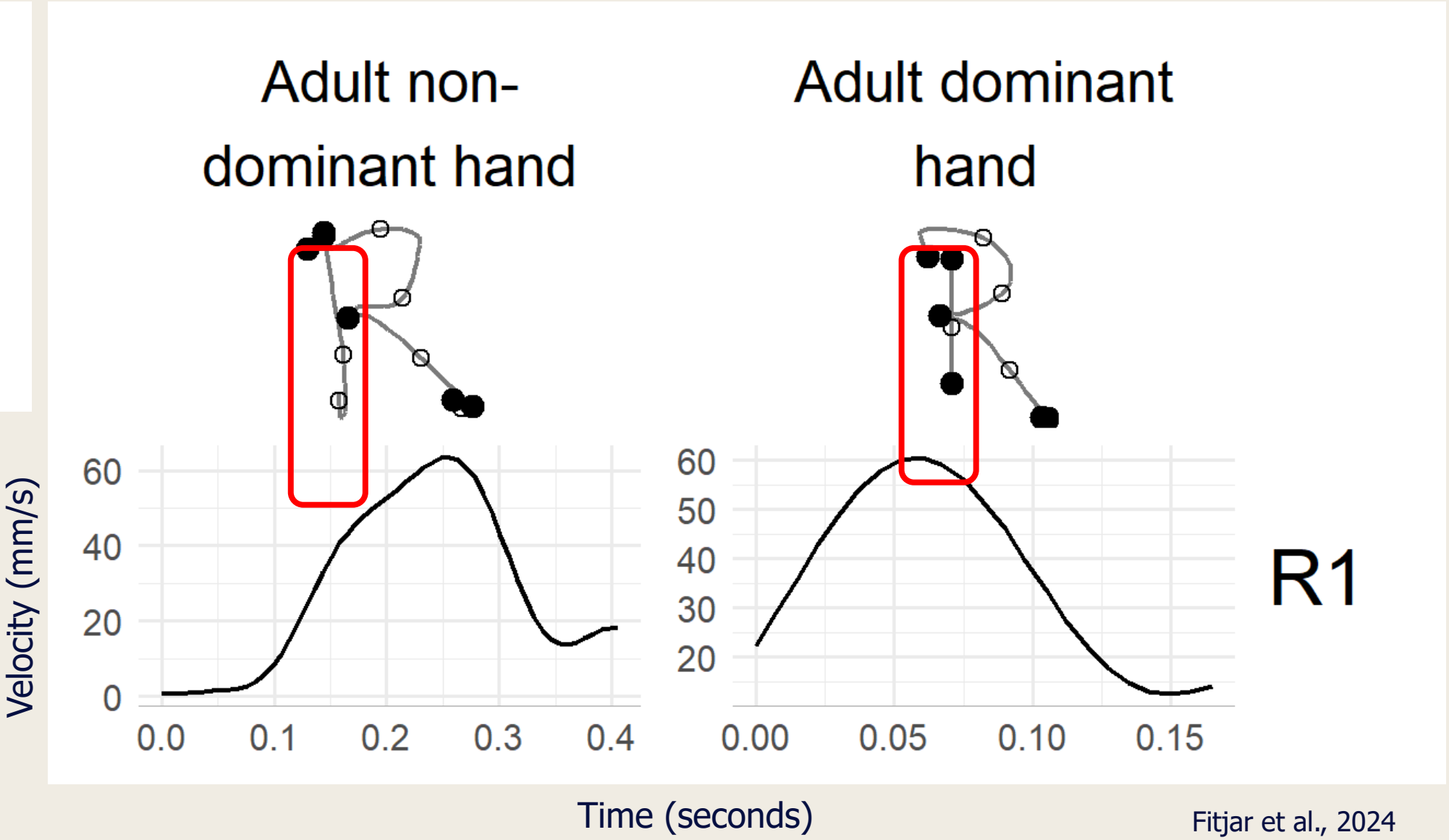
- Koble fonem – grafem
- Hente fram allograf (versjon av bokstaven)
- Aktivere en effektor *uavhengig* motorplan
- Aktivere en effektor *avhengig* motorplan



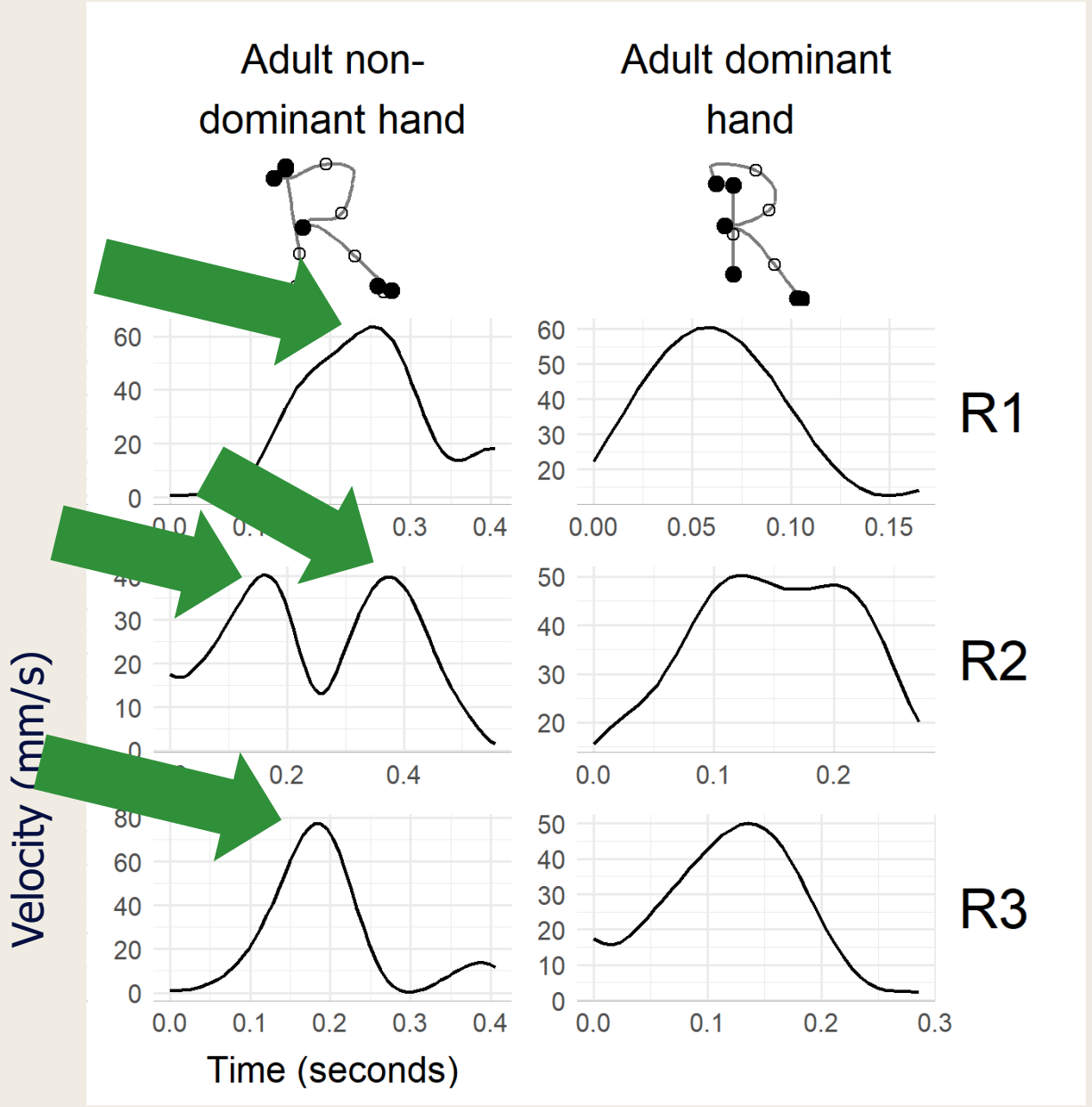
McCloskey (2023)

Effektor: den kroppsdelen som utfører handlingen





Fitjar et al., 2024



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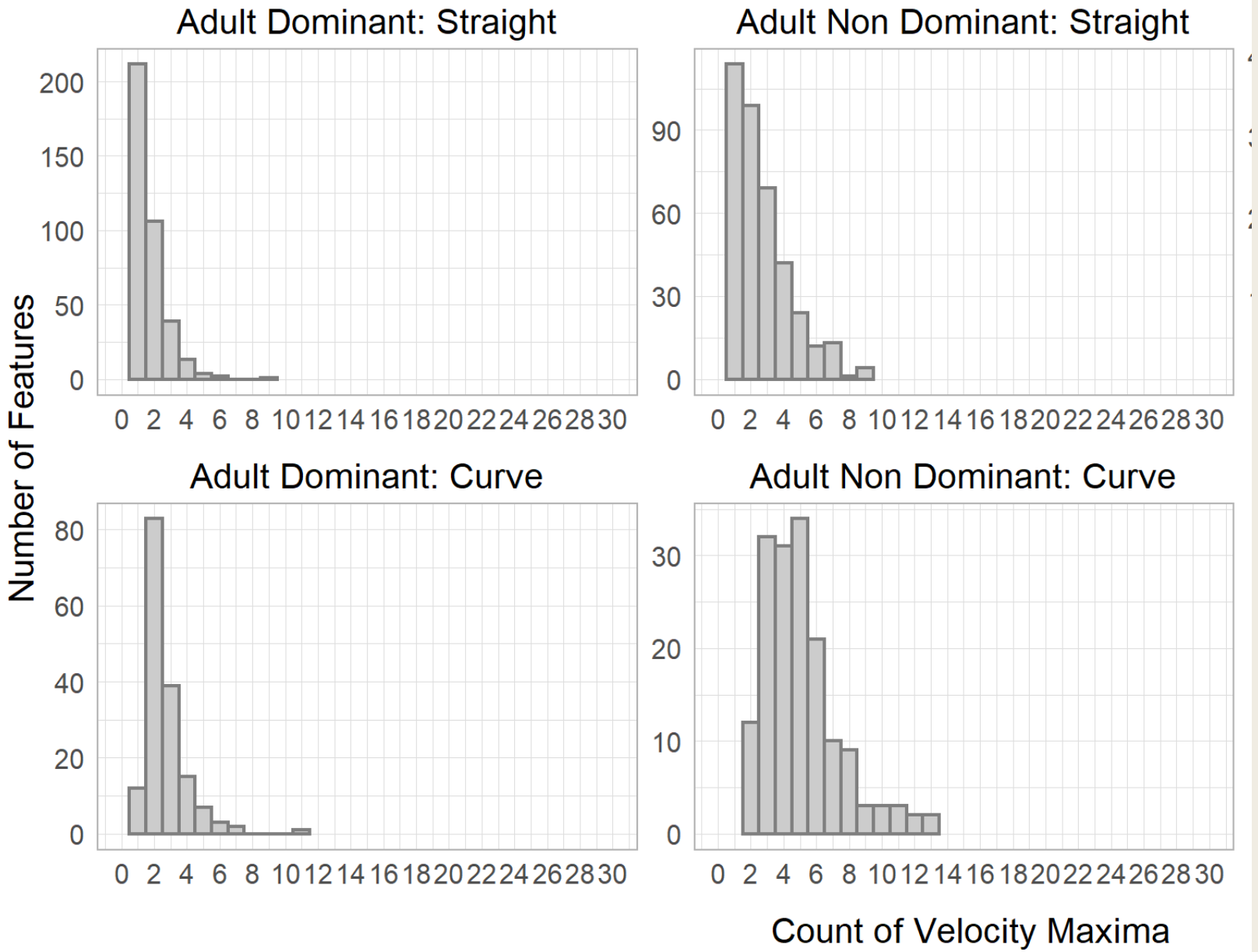

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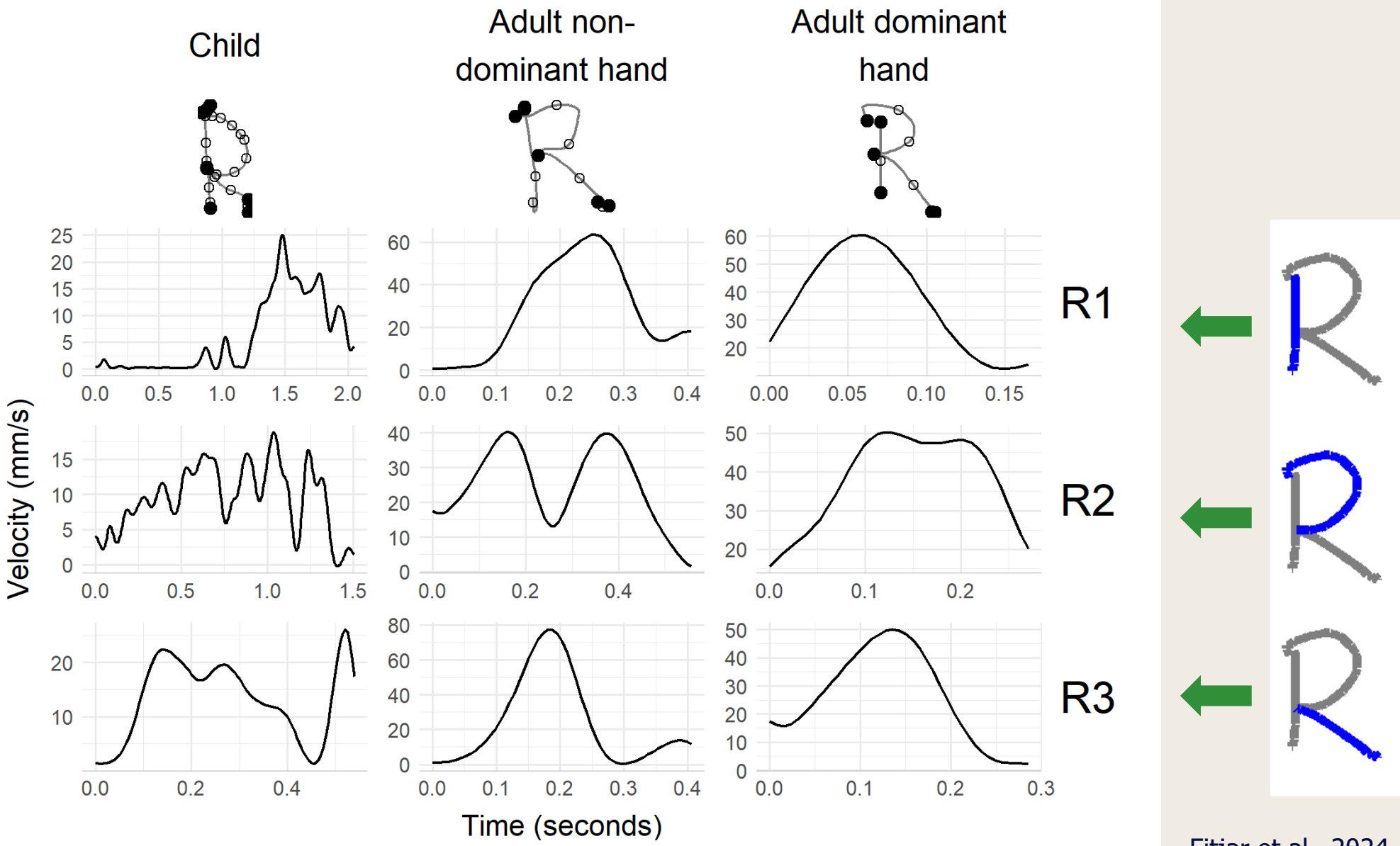

Fitjar et al., 2024

Hva bidrar til flyt i pennebevegelsen?

- 177 barn / 10 skoler
- 1. klasse (September)

frontiers in Psychology

ORIGINAL RESEARCH
published: 20 May 2021
doi: 10.3389/fpsyg.2021.663829

Learning Handwriting: Factors Affecting Pen-Movement Fluency in Beginning Writers

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Skilled handwriting of single letters is associated not only with a neat final product but also with fluent pen-movement, characterized by a smooth pen-tip velocity profile. Our study explored fluency when writing single letters in children who were just beginning to learn to handwrite, and the extent to which this was predicted by the children's pen-control ability and by their letter knowledge. 176 Norwegian children formed letters by copying and from dictation (i.e., in response to hearing letter sounds). Performance on these tasks was assessed in terms of the counts of velocity inversions as the children produced sub-letter features that would be produced by competent handwriters as a single, smooth (ballistic) action. We found that there was considerable variation in these measures across writers, even when producing well-formed letters. Children also copied unfamiliar symbols, completed various pen-control tasks (drawing lines, circles, garlands, and figure eights), and tasks that assessed knowledge of letter sounds and shapes. After controlling for pen-control ability, pen-movement fluency was affected by letter knowledge (specifically children's performance on a task that required selecting graphemes on the basis of their sound). This was the case when children retrieved letter forms from dictated letter sounds, but also when directly copying letters and, unexpectedly, when copying unfamiliar symbols. These findings suggest that familiarity with a letter affects movement fluency during letter production but may also point towards a more general ability to process new letter-like symbols in children with good letter knowledge.

Keywords: children, handwriting, fluency, pen-control, letter knowledge

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Edited by:
Anna Maria Re,
University of Turin, Italy

Reviewed by:
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Specialty section:
This article was submitted to Educational Psychology, a section of the journal Frontiers in Psychology

Received: *03 February 2021*
Accepted: *13 April 2021*
Published: *20 May 2021*

Citation:
Fitjar CL, Rønneberg V, Nottbusch G and Torrance M (2021) Learning Handwriting: Factors Affecting Pen-Movement Fluency in Beginning Writers. Front. Psychol. 12:663829.

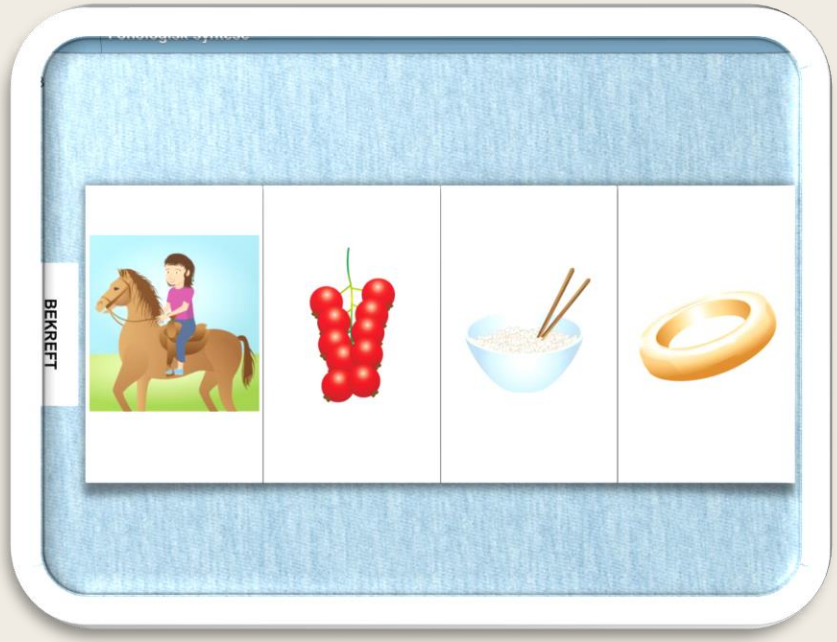
INTRODUCTION

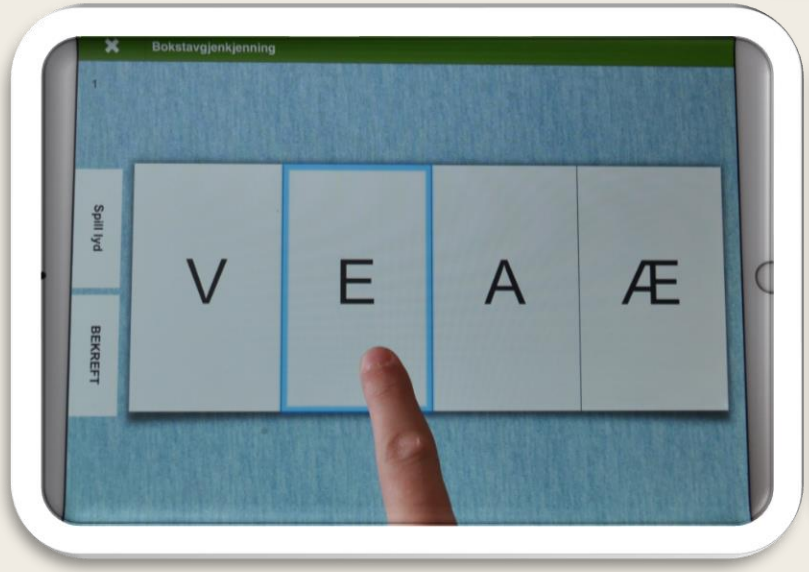
It is still the case that in nearly all educational contexts children first learn to write by forming letters with pen or pencil on paper. The ability to handwrite is therefore a prerequisite for beginning to write. There is also evidence that, as children write longer texts, ability to retrieve and form letters and words quickly predicts the substantive quality of their written compositions (Feng et al., 2019). Several authors have argued that slow handwritten output not only reduces productivity – important when task duration is limited by time or motivation – but also demands attention that might otherwise be devoted to thinking about higher-level text structures (e.g., Berninger and

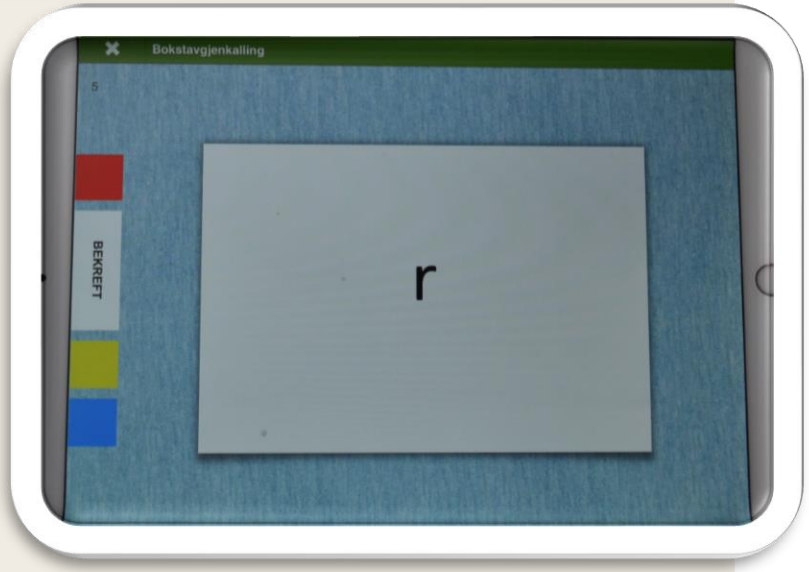
Hva bidrar til flyt i pennebevegelsen hos førsteklassinger?

Kjennskap til bokstaver og avkoding

- Framlydsanalyse
- Ordlesing
- Fonologisk syntese
- Bokstavlydgjenkalling
- Staving (på papir)



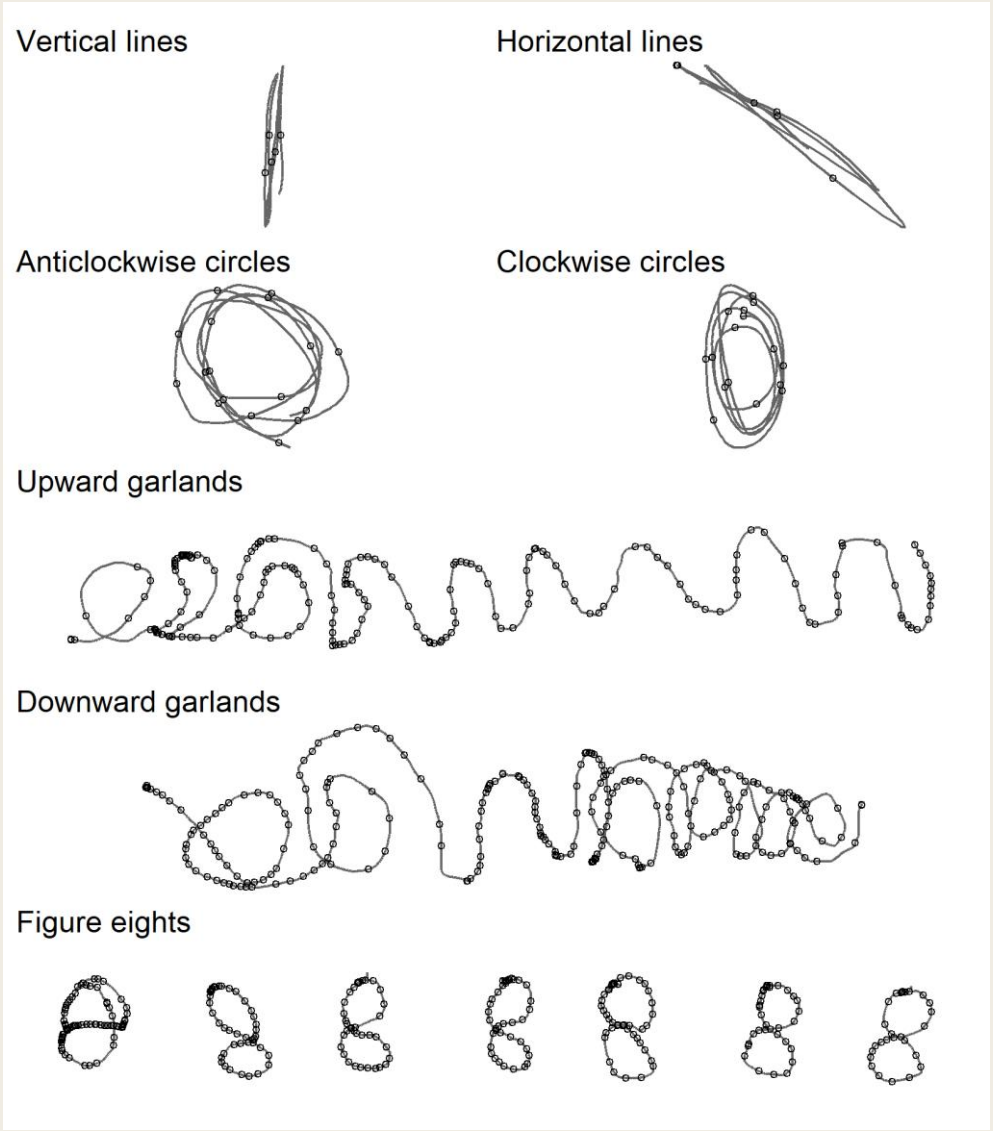




Hva bidrar til flyt i pennebevegelsen hos førsteklassinger?

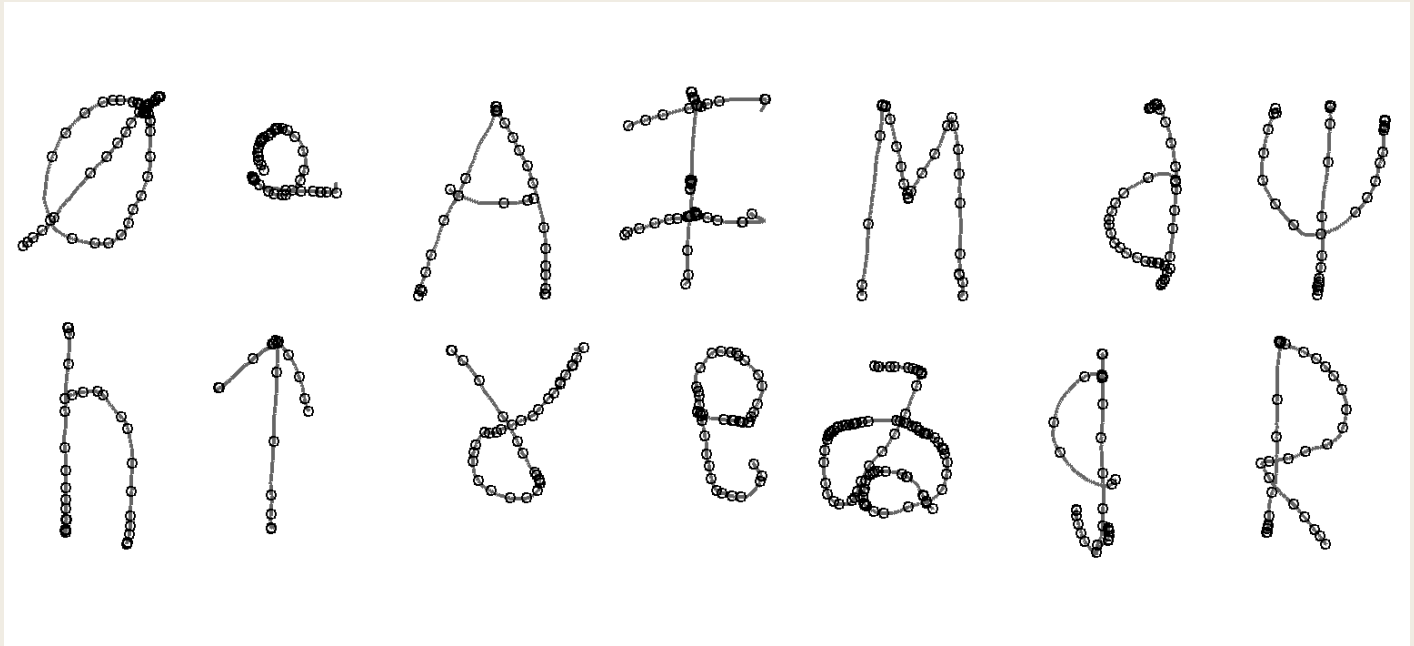
Kontroll på pennen – fra lett til vanskelig:

- Potensial for flytende pennebevegelse
  (Mai & Marquardt, 1994)
- Visuomotorisk integrering
- Symbol som ikke er bokstav gjentatte ganger

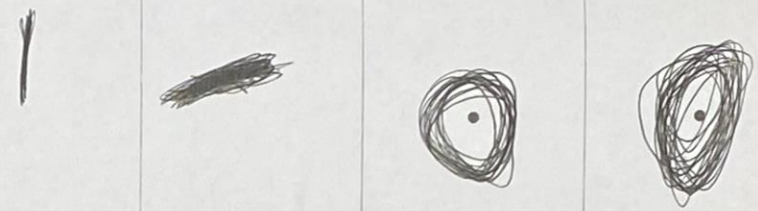


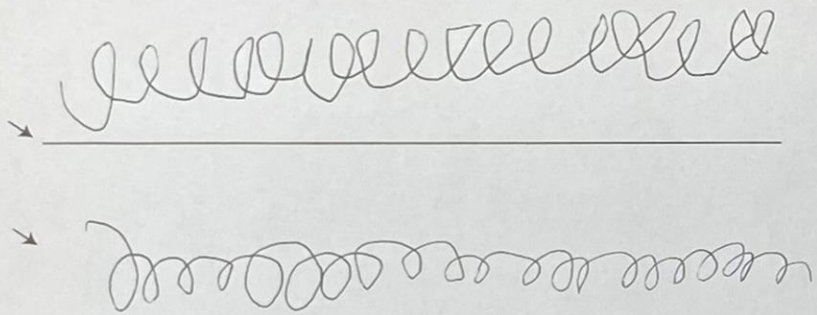
Kopiere kjente og ukjente bokstaver

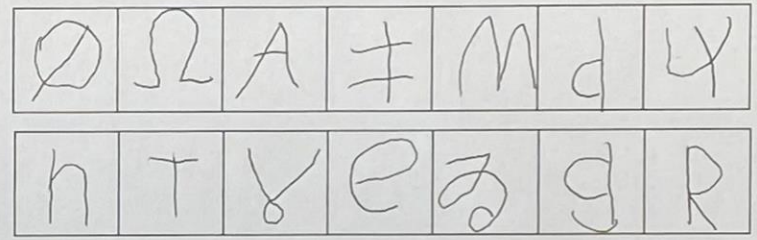
A	‡	M	d
Ψ	h	T	ɣ
e	ぁ	g	R

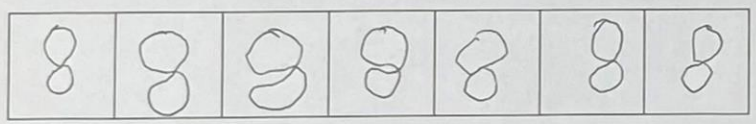


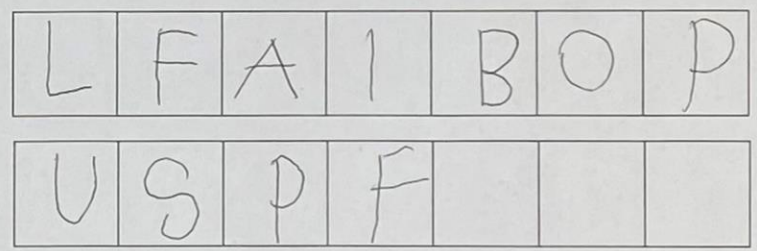
HANNA











Pen-movement disfluency (velocity peak count) when copying characters. Estimated effects with 95% CI.	Main effects	Interaction with Feature-is-curve	Interaction with Character-is-letter
Intercept	10 [8.0, 12]		
Feature is malformed (vs. correct)	3.0 [2.1, 3.9] ***		
Feature is a curve (vs. straight line)	7.3 [6.7, 8.0] ***		
Character is a letter (vs. symbol)	-2.1 [-4.8, .52]		
Pen-control fluency			
Lines	-.31 [-1.0, .42]	.12 [-.46, .70]	.32 [-.24, .87]
Circles	.55 [-.20, 1.3]	.53 [-.06, 1.1]	-.06 [-.63, .50]
Garlands	.73 [.01, 1.5] *	.37 [-.21, .94]	-.56 [-1.1, -.00] *
Figure Eights	1.8 [1.1, 2.5] ***	1.3 [.70, 1.8] ***	-.58 [-1.1, -.05] *
Letter knowledge			
Phoneme to Grapheme encoding	-1.1 [-1.8, -.34] **		
Phoneme isolation	.01 [-.74, .75]		
Phoneme blending	.36 [-.35, 1.1]		

Note. Parameter estimates from a linear mixed-effects model with random by-item and by-subject intercepts.
Blank cells indicate that effect was absent in the best-fit model. * $p < .05$, ** $p < .01$, *** $p < .001$

Å lære å skrive bokstaver handler om noe mer enn å forme pene bokstaver.

Flytende bokstavforming kan forklares med god kjennskap til bokstaver generelt sett.

Det handler om å lære hva en bokstav er i vårt alfabet, hvordan kan bokstaver se ut og hva representerer de.

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