

ReadMe file to accompany VMM_Writing_Reading_Waterman_et_al_Data.csv

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SHORT DESCRIPTION OF WHAT THE DATA IN THE CSV FILE:

- Contains participant-by-participant data for all participants who completed the experimental study described in the paper.
- All statistical analysis described in the paper were run on this dataset (i.e. this dataset is the one from which the results reported were generated).
- Each row of the file pertains to a single participant with their recordings in relation to specific variables presented column-by-column. Column headings are defined in the following section.

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DEFINITION OF COLUMN HEADINGS/ROW LABELS; DATA CODES AND MEASUREMENT UNITS:

Column*	Heading	Definition	Coding/Measurement	Units/Scale
A	ID	Unique Identification code for participant	n/a	n/a
B	YearGroup_School	Year Group in school	2 = Year 2 (6-7 years old); 4 = Year 4 (8-9 years old); 6 = Year 6 (10-11 years old)	n/a
C	Hand	Preferred hand for holding stylus	Right; Left; missing	n/a
D	Sex	Gender of participant	M = Male; F = Female	n/a
E	Date_of_test	Date on which they participated in the study	n/a	DD/MM/YYYY
F	Age_Cat	Categorical age (range) of participant**	n/a	Years
G	Reading_Level	Reading Level as assessed by school	National Curriculum levels (range from 2c up to 5a)	See Reference [1]

H	Reading_converted	Reading Level converted into numerical values	Each level assigned a consecutive integer value (e.g. 2c = 1, 2b = 2; 2a = 3; etc...)	Unitless
I	Writing_Level	Writing Level as assessed by school	National Curriculum levels (range from 2c up to 5a)	See Reference [1]
J	Writing_Converted	Writing Level converted into numerical values	Each level assigned an consecutive integer value (e.g. 2c = 1, 2b = 2; 2a = 3; etc...)	Unitless
K	Copying_OE	Optimsed Error (OE) value for Copying task***	n/a	Unitless
L	Shape1_OE	OE value for drawing Path 1 trials within the VMM task	n/a	Unitless
M	Shape2_OE	OE value for drawing Path 2 trials within the VMM task	n/a	Unitless
N	Shape3_OE	OE value for drawing Path 3 trials within the VMM task	n/a	Unitless
O	Shape4_OE	OE value for drawing Path 4 trials within the VMM task	n/a	Unitless
P	Shape5_OE	OE value for drawing Path 5 trials within the VMM task	n/a	Unitless
Q	Shape6_OE	OE value for drawing Path 6 trials within the VMM task	n/a	Unitless
R	Shape7_OE	OE value for drawing Path 7 trials within the VMM task	n/a	Unitless
S	Shape8_OE	OE value for drawing Path 8 trials within the VMM task	n/a	Unitless

T	Shape9_OE	OE value for drawing Path 9 trials within the VMM task	n/a	Unitless
U	OE_avg_simple	Mean average OE value for VMM trials in which paths have consistent heights and widths	n/a	Unitless
V	OE_avg_medium	Mean average OE value for VMM trials in which paths have consistent heights or widths	n/a	Unitless
W	OE_avg_hard	Mean average OE value for VMM trials in which paths have inconsistent heights and widths	n/a	Unitless
X	OE_avg_overall	Mean average OE value for all VMM trials	n/a	Unitless

* When opened in Excel

**Exact age and date of birth of participants removed to respect anonymity

***VMM task with no memory component (i.e. target shape always visible on screen, not being drawn from memory)

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BRIEF DESCRIPTION OF PRE-PROCESSING STEPS

- Participants raw performance data for the VMM and copying tasks were captured using the KAT system [2]
- Raw positional data from individual trials was then post-processed in Matlab (version 7.10.0 r2010a, The MathWorks Inc.)
- Post-processing converted unfiltered x/y positional data from a trail, indicating the position of the tablet stylus on the screen across time, into a single Optimised Error (OE) value for that given trial. A mean average for OE performance on the pairs of trials in which identical shapes/paths were presented were then calculated, resulting in the data reported in the csv file (columns L to U). OE represents the ability to accurately reproduce the target shape by quantifying the congruence between participant's raw input and the target shape.
- The point-set registration technique utilised in the OE calculations has been described in previous publication [3-4]. Use of the KAT system, VMM task and the Matlab scripts used to perform the OE calculation can be arranged through personal communication and discussion with the authors. If required the authors can also prepare and make available for sharing the raw positional data files, which are currently unanonymised.

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REFERENCES:

1. <http://www.devon.gov.uk/fostering-national-curriculum-levels.pdf>

2. Culmer P.R., Levesley M.C., Mon-Williams M., Williams J.H.G. 2009 A new tool for assessing human movement: The Kinematic Assessment Tool. Journal of Neuroscience Methods 184(1), 184-192. (DOI: 10.1016/j.jneumeth.2009.07.025)

3. Gonzalez C., Anderson J., Culmer P., Burke M.R., Mon-Williams M., Wilkie R.M. 2011 Is tracing or copying better when learning to reproduce a pattern? Experimental Brain Research 208(3), 459-465. (DOI: 10.1007/s00221-010-2482-1)

4. Myronenko A., Song X. 2010 Point set registration: Coherent point drifts. IEEE Transactions on Pattern Analysis and Machine Intelligence 32(12), 2262-2275. (DOI: 10.1109/TPAMI.2010.46)