Data in Brief 21 (2018) 2129–2133

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Feature coding dataset for trained and untrained working memory tasks in randomized controlled trials of working memory training

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A R T I C L E I N F O

Article history:
Received 22 October 2018
Received in revised form
2 November 2018
Accepted 8 November 2018
Available online 14 November 2018

A B S T R A C T

The data presented in this article are produced as part of the original research article entitled "Working memory training involves learning new skills" (Gathercole, Dunning, Holmes & Norris, in press). This article presents a dataset of coded features for pairs of trained and untrained working memory (WM) tasks from randomized controlled trials of WM training with active control groups. Feature coding is provided for 113 untrained WM tasks each paired with the most similar task in the training program, taken from 23 training studies. A spreadsheet provides summary information for each task pair, its transfer effect size, and coding of the following features for each task: stimulus category, stimulus domain, stimulus modality, response modality, and recall paradigm.

Specifications table

Subject area	*Psychology*
More specific subject area	*Cognitive psychology*
Type of data	*Excel spreadsheet*

DOI of original article: https://doi.org/10.1016/j.jml.2018.10.003

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https://doi.org/10.1016/j.dib.2018.11.040

How data were acquired	*Taken from published reports and where necessary supplied by authors on request*
Data format	*Raw*
Experimental factors	*None*
Experimental features	*Pairs of trained and untrained working memory tasks were coded according to a novel feature coding protocol*
Data source location	*Data are held in the home institutions of the 23 original articles listed in* Table 1
Data accessibility	*Data supplied with the article*
Related research article	Gathercole SE, Dunning DL, Holmes J, Norris DG. Working memory training involves learning new skills. J Mem & Lang. in press. [1]

Value of the data

- This assembly of effect sizes for transfer following working memory (WM) to other WM tasks provides a resource that will enable other researchers to analyze the factors associated with transfer.
- The specification of coded features will facilitate the development of an expanded protocol to guide understanding of the cognitive mechanisms underpinning transfer following WM training.
- This illustration of the feature coding protocol could support its application to other studies and areas of cognitive training.
- The transfer effect size data will aid the calculations of statistical power in future studies of WM training.

1. Data

The data consist of 113 pairs of trained and untrained tasks derived from 23 published randomized controlled trials (RCTs) of transfer following working memory training that included an active control group. the spreadsheet supplies the following information about each pair of tasks: a brief task summary, details of the participants, the effect size for transfer, and coding of the following features – stimulus category, stimulus domain, stimulus modality, response modality, and recall paradigm.

2. Experimental design, materials and methods

The criteria for selection of the randomized controlled trials of WM training are described in Gathercole et al. (2018) [1] (YJMLA3988). Details of the studies are provided in Table 1.

Task pairing and feature coding were conducted as follows. Each untrained WM task was matched with a single WM task in the training program and both tasks were then coded according to five categories of feature: stimulus type (digits, letters, words, objects, spatial locations), stimulus domain (verbal, visuo-spatial), stimulus modality (auditory, visual), response modality (spoken, manual), and recall paradigm (serial recall, complex span, backward span, running span and N-back). Coding of the 'serial recall' feature was restricted simple serial recall tasks and not to the other complex WM paradigms which also require the recall or serial order. Feature coding was conducted independently by SG and DD/ JH, with differences resolved by discussion. The procedure for matching the trained task with each untrained task within each study was as follows.

Table 1
Characteristics of the selected studies.

Study	Sample	Selection criteria	N experimental group	N control group
Ang et al. [2]	School-age children	Low working memory	32 (updating), 25 (Cogmed)	28
Bergman Nutley et al. [3]	Preschool children	none	24	26
Bigorra et al. [4]	School-age children	ADHD	30	31
Brehmer et al. [5]	Adults	20–30 years & 60–70 years	54	45
Chacko et al. [6]	School-age children	ADHD	44	41
Chooi & Thompson [7]	Adults	None	15	26
Dentz et al. [8]	18–63 years	ADHD	23	21
Dunning & Holmes [9]	18–21 years	None	15	15
Foster et al. [10]	18–35 years	Low and high memory span	40 (complex span), 39(running span)	39
Gray et al. [11]	Adolescents	Learning difficulties & ADHD	32	20
Harrison et al. [12]	Adults	None	21 (complex span), 17 (simple span)	17
Henry et al. [13]	School-age children	None	18	18
Hitchcock, Westwell [14]	School-age children	None	50	44
Karbach et al. [15]	School-age children	None	14	14
Kundu et al. [16]	Adults	None	15	15
Lawlor-Savage, Goghari [17]	Adults	None	27	30
Metzler-Baddeley et al [18]	Adults	None	20	20
Minear et al. [19]	Adults	None	31 (n-back1), 32 (complex span)	26
Passolunghi & Costa [20]	Preschool children	None	15	15
Redick et al. [21]	Adults	None	24	29
Thompson et al. [22]	Adults	None	20	19
Van der Molen et al. [23]	Adolescents	Learning difficulties	41	26
von Bastian et al. [24]	Adults	18–35 years & 61–77 years	61	62

(i) Match on both paradigm and stimulus domain (e.g., verbal & complex span).
(ii) If 1 is not possible, match on paradigm alone (e.g., complex memory, or serial recall).
(iii) If 2 is not possible or there are multiple trained tasks for 2, match on the trained task with the greatest total number of other matched features.
(iv) If two or more training activities are equivalently matched according to the above criteria, select a single representative trained task for matching.

For some tasks, it was necessary to code multiple features within a single category. For example, each stimulus item in a dual n-back task consists of both a verbal and visuo-spatial stimulus and was coded as having both features. In total, 113 pairs of trained (T) and untrained (UT) WM tasks met the task selection criteria. For each task pair, each feature was coded as either not present (empty cell), present in the trained task only (T), present in the untrained task only (UT), or present in both tasks (T&UT). In the four studies in which different groups performed different WM training programs, each untrained task was matched with the closest task from each of the different training programs, generating multiple task pairs for the same untrained task. The full feature coding matrix is provided in Table S2.

Cohen's d was employed as an index of the effect size for transfer following adaptive training for each pairs of tasks. This is calculated as the difference in the performance gains on the untrained task (post- vs pre-training scores) between groups (adaptive group gain score – control group gain) divided by the pooled SD of the gains scores from both groups.

Acknowledgments

This research was supported by the Medical Research Council of the UK, the University of Cambridge, the Economic and Social Research Council, UK (RES-000-23-0979), and the Leverhulme Trust, UK (F00/224/AI).

Transparency document. Supporting information

Transparency document associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.11.040.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.11.040.

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