

# User Perceptions of Five-Word Passwords

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## A ARTIFACT APPENDIX

### A.1 Abstract

In our paper we explore a specific passphrase selection strategy called five-word passwords, where users are assigned five random words to form the basis of a passphrase. We first surveyed  $n = 150$  participants where each was assigned to three different treatments with different five-word password generation methods. After two weeks  $n = 116$  participants came back for a second part where they were asked to recall the five-word password and some questions about this format of passphrase. In this artifact, we provide (1) survey code for both parts of the survey; (2) docker images used to handle both front and back ends of the survey; (3) List of 1,630 words we used as a dictionary for generating five-word passwords; (4) responses from participants from both survey; (5) codebook used to encode participants' response to free text questions; (6) jupyter files used for graph creation.

### A.2 Artifact check-list

- **Data set:** Provided in the survey-data folder of the Github repository.
- **Run-time environment:** Docker, Jupyter Notebook (re-create graphs used for the paper).
- **Hardware:** A functional PC, Mac or Linux machine.
- **Disk space (approximately)?:** 200MB
- **How much time is needed to prepare workflow (approximately)?:** Depending on whether the required environment (Docker and Jupyter Notebook) and required packages are pre-installed. If none of the above are install, the setup should take around an hour.
- **How much time is needed to complete experiments (approximately)?:** Once the environment is set up, the approximate time to complete both survey should take less than 20 minutes.
- **Archived:** <https://github.com/gwusec/2022-ACSAC-Five-word-Passwords>

### A.3 Data Collected

<https://github.com/gwusec/2022-ACSAC-Five-word-Passwords/survey-data/README.md>

### A.4 Installation

<https://github.com/gwusec/2022-ACSAC-Five-word-Passwords/survey/README.md>

### A.5 Experiment Workflow

We performed this study with a two-part survey. Data were collected from the survey and we used qualitative coding to analyze participants' response to free-response questions. Jupyter notebooks were used to quantitatively analyze participants' quantitative response and five-word passwords collected from the survey. Both

codebook and jupyter notebooks are provided alongside raw data of survey response.

### A.6 Codebook

- **secure (131)**  
*hard-guess (16), hard-crack (13), length (10), random (6), unique (6), no-personal (5), not-confident (4), not-enough (4), dots (3), uncommon (2), word-choice (2), no-sense (1), infinit-combo (1), special (1), not-remember (1), only-words (1), prefer-password-manager (1)*
- **words-and-chars (125)**  
*random (44), personal (30), pet-name (6), easy-to-remember (5), sentence (1), movie (1), favorite (1), anime (1), object (1)*
- **easy-to-remember (125)**  
*words (9), sentence (7), short (7), humor (4), rhythmic (4), theme (4), rhythm (3), story (3), strong (2), word-ordering (2), first-letter (2), frequently-use (2), relatable (1), spelling (1), coherent (1), common-words (1), first-combo (1), secure (1), relate-to-words (1), typo (1), one-syllable (1)*
- **no-change (109)**
- **combination (93)**  
*nums-letters-symbols (25), nums-words-symbols (11), words (9), nums-words (8), personal (7), nums-letters (6), letters-symbols (3), words-symbols (2), letters (2), object-inspiration (1), nums-symbols (1)*
- **numbers (60)**  
*personal (11)*
- **add (57)**  
*symbols (28), numbers (18), nums (17), capitals (14), caps (8), special-chars (6), characters (2), acronym (1), punctuation (1), words (1), similar-words (1), favorite-movie-char (1)*
- **repeat (53)**  
*in-head (22), oral (13), visual (4)*
- **words (40)**  
*personal (13), work (11), favorite-words (4), company-name (4), random (3), usual-pass (1), company-name-+-CEO-name (1), review (1), last-two (1)*
- **same (37)**  
*variation (18), change-regularly (1), change-monthly (1)*
- **hard-to-remember (36)**
- **not-secure (35)**  
*easy-crack (10), only-words (9), add-symbols (5), easy-guess (5), add-nums (5), add-caps (2), breach (1), hack (1), better-than-normal (1), short (1), personal (1), hard-crack (1)*
- **memory (32)**
- **usual-pass (31)**
- **write-down (24)**  
*photo (2), store (1)*
- **no-method (24)**
- **n/a (22)**
- **bad-memory (21)**

- **physical-storage** (21)
- **password-manager** (39)
- **variation** (18)  
*usual-pass* (14), *change-quarterly* (1), *object-inspiration* (1), *change-monthly* (1)
- **change** (18)  
*length* (7), *words* (5), *entire-pass* (2), *first-word* (1), *into-sentence* (1), *style* (1), *word-odd* (1), *structure* (1)
- **unique** (17)
- **browser-storage** (16)
- **surroundings** (15)
- **change-words** (14)  
*memorable* (3), *sentence* (2), *complex* (2), *personal* (2), *no-personal* (1), *monosyllable* (1)
- **sentence** (13)
- **passwordbank** (12)  
*variation* (2)
- **change-length** (12)  
*reduce* (7), *increase* (1)
- **must-use-everyday** (9)
- **acronyms** (9)
- **file-storage** (9)
- **make-easy-to-remember** (9)
- **good-memory** (9)
- **object-inspiration** (9)  
*work* (6), *personal* (1), *favorite* (1)
- **secure-for-some** (9)
- **long** (8)
- **remember-few** (8)
- **hard-to-guess** (8)
- **favorite** (7)  
*sayings* (1)
- **remove** (7)  
*periods* (5), *words* (1), *all-s* (1)
- **within-dictionary** (6)  
*short-words* (1)
- **imagination** (6)
- **meanings** (6)
- **nums** (6)  
*work* (3), *personal* (2), *personal-+-work* (1)
- **use-only-one** (6)
- **use-pass-manager** (6)
- **things-on-mind** (5)
- **passwordbank-2** (5)  
*categorized* (1)
- **story** (5)
- **change-dots** (4)
- **needs-personal-meaning** (4)
- **personal** (4)
- **device** (4)  
*mnemonic* (3)
- **passwordbank-3** (4)
- **get-used-to** (4)
- **random** (4)
- **common** (4)
- **formula** (4)
- **make-familiar** (3)
- **passwordbank-5** (3)
- **order-matters** (3)
- **phrase** (3)
- **use-method** (3)
- **first-combo** (3)
- **different-format** (2)
- **context** (2)  
*meaningful* (2)
- **do-not-want-use** (2)
- **better-than-other** (2)  
*short* (1)
- **accident** (2)
- **next-word** (2)  
*secure* (1)
- **theme** (2)
- **work-related** (2)
- **not-five** (2)
- **randomly** (2)  
*story* (1)
- **feelings** (2)
- **unsure** (2)
- **seems-right** (1)
- **make-personal** (1)
- **none** (1)
- **larger-dictionary** (1)
- **good-method** (1)
- **starting-words** (1)
- **hard-remember** (1)
- **unused** (1)
- **only-if-easy** (1)
- **passwordbank-4** (1)  
*categorized* (1)
- **passwordbank-6** (1)
- **forgot-last-word** (1)
- **simple-words** (1)
- **funny** (1)
- **group-pairs** (1)
- **familiar** (1)
- **positive** (1)  
*use-in-future* (1)
- **nice** (1)
- **secure-enough** (1)
- **like-the-flow** (1)
- **simple** (1)
- **increase-dictionary-size** (1)
- **easy-remember** (1)
- **not-complicated** (1)
- **important** (1)
- **reorder** (1)
- **personal-connection** (1)
- **atypical-format** (1)
- **no-more-secure** (1)  
*current-pword* (1)
- **like-the-combination** (1)
- **unique-combo** (1)
- **needs-theme** (1)