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Recall Accuracy of Self-generated Passwords with and without Generation Criteria Reminders

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1. Introduction

- A good password should have two features: easy to memorize and difficult to crack.
- The more criteria that are applied to generate an acceptable password, the greater the security the resulting password provides but the more difficult it is to remember (Proctor et al., 2002).
- Studies of human memory show that recall is improved if the context at the time of retrieval matches that of the initial memorization (Smith et al., 1978).
- Current study: Investigated whether the presentation of the password generation criteria at the time of recall facilitates password retrieval.

2. Online Study (Amazon Mechanical Turk)

Part 1: Password Generation

600 participants were asked to create one password based on the provided criteria and re-enter the password immediately to confirm it.

14+ Days Delay

Part 2: Password Recall

- 39% of participants returned to re-enter the password they created. Half were presented the password generation criteria, and half were not.
- If not recalled correctly on the first try, two additional tries were allowed.

Not presented the criteria

USERNAME: XXXX
PASSWORD

Presented the criteria

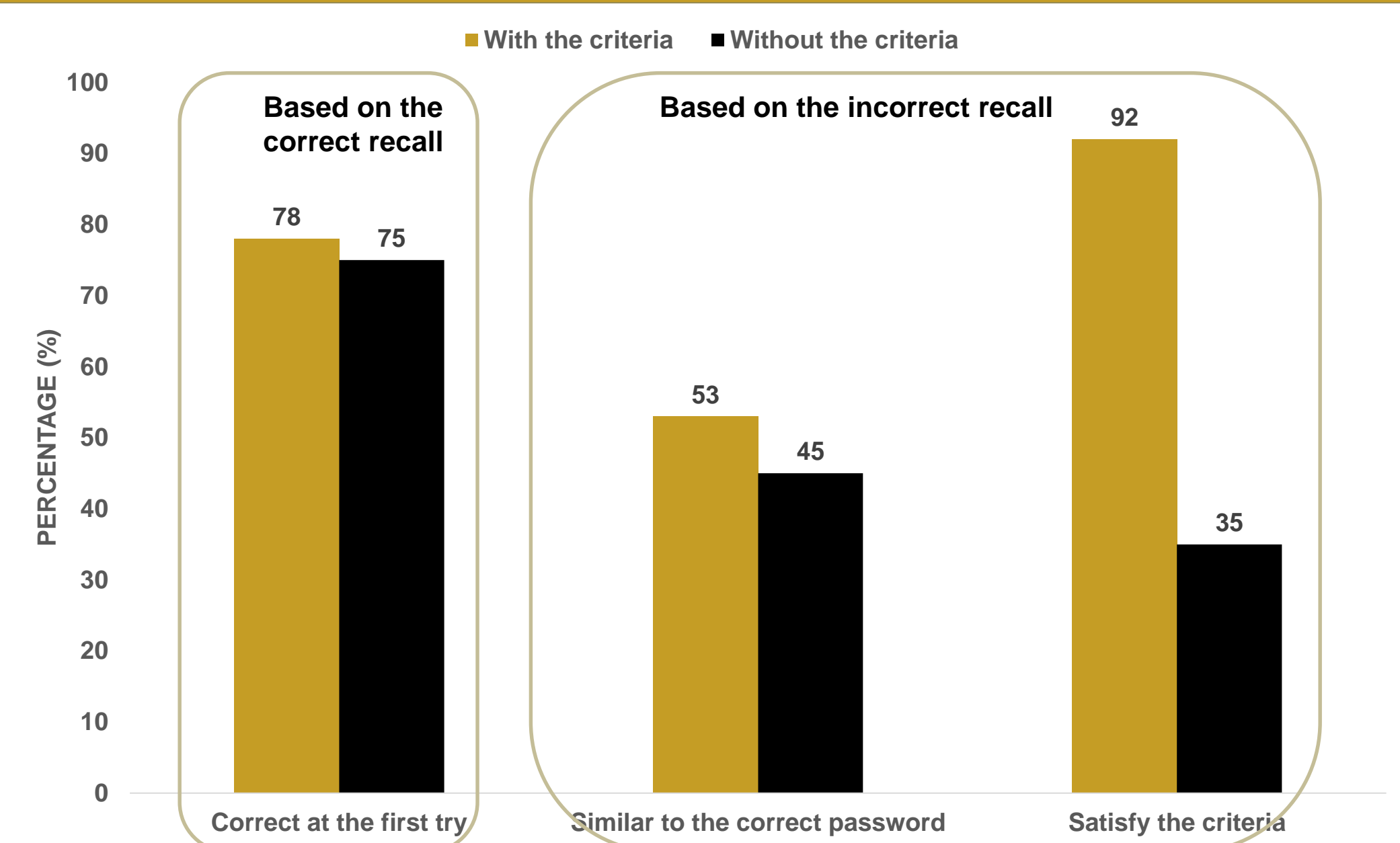
USERNAME: XXXX
PASSWORD

Your password contains:

- at least 8 characters;
- at least 1 letters;
- at least 1 number;
- at least 1 special symbol.

3. Results

- More than 75% of the passwords correctly recalled were on the first try, with no difference between the two groups.
- Overall, the correct recall rate for the group presented with the generation criteria (48%) did not differ significantly from that of the group without the generation criteria (43%).
- For both conditions, about 50% of the incorrect passwords were similar to the correct password (more than 3 continuous identical characters in the recalled password and the correct password).
- More incorrect passwords satisfied the criteria when the criteria were presented than when they were not, $\chi^2(1) = 43.02$, $p < .001$.



4. Discussion

- Presentation of generation criteria did not significantly facilitate recall of the correct password, but it made participants think about the criteria more closely when they attempted to recall their passwords.
- There are two possible reasons for the absence of a significant facilitation effect:
 - The generation criteria used here are common and may not differentiate between passwords.
 - Only one password was generated and needed to be remembered for this study.
- Less typical criteria and more than one password generation should be investigated in the future.

References

- Proctor, R. W., Lien, M. C., Vu, K. P. L., Schultz, E. E., & Salvendy, G. (2002). Improving computer security for authentication of users: Influence of proactive password restrictions. *Behavior Research Methods, Instruments, & Computers*, 34, 163-169.
- Smith, S. M., Glenberg, A., & Bjork, R. A. (1978). Environmental context and human memory. *Memory & Cognition*, 6, 342-353.