

# Follow My Voice: The Future of PHR Authentication

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## Introduction

The current electronic personal health record (PHR) has low patient adoption [1]. **Increasing use and adoption of the PHR will improve patient-centered care.** Users often have difficulty remembering passwords or share them, giving multiple people access to one account.

Utilizing biometrics for authentication is becoming more common in our daily lives – think of the fingerprint sensor on a smartphone or retina scanners at high security corporations. The quickly evolving technology that runs our lives calls for incorporating biometric authentication into more systems. Using **biometric authentication can ensure that passwords would not need to be remembered and that only the registered user has access to the account.** A highly useable and accessible biometric to use is voice. Everyone has a unique voice that can be used for authentication. Also, phones are readily available to use for voice detection. The proposed research is to **assess electronic PHR users' acceptance towards using voice authentication.**

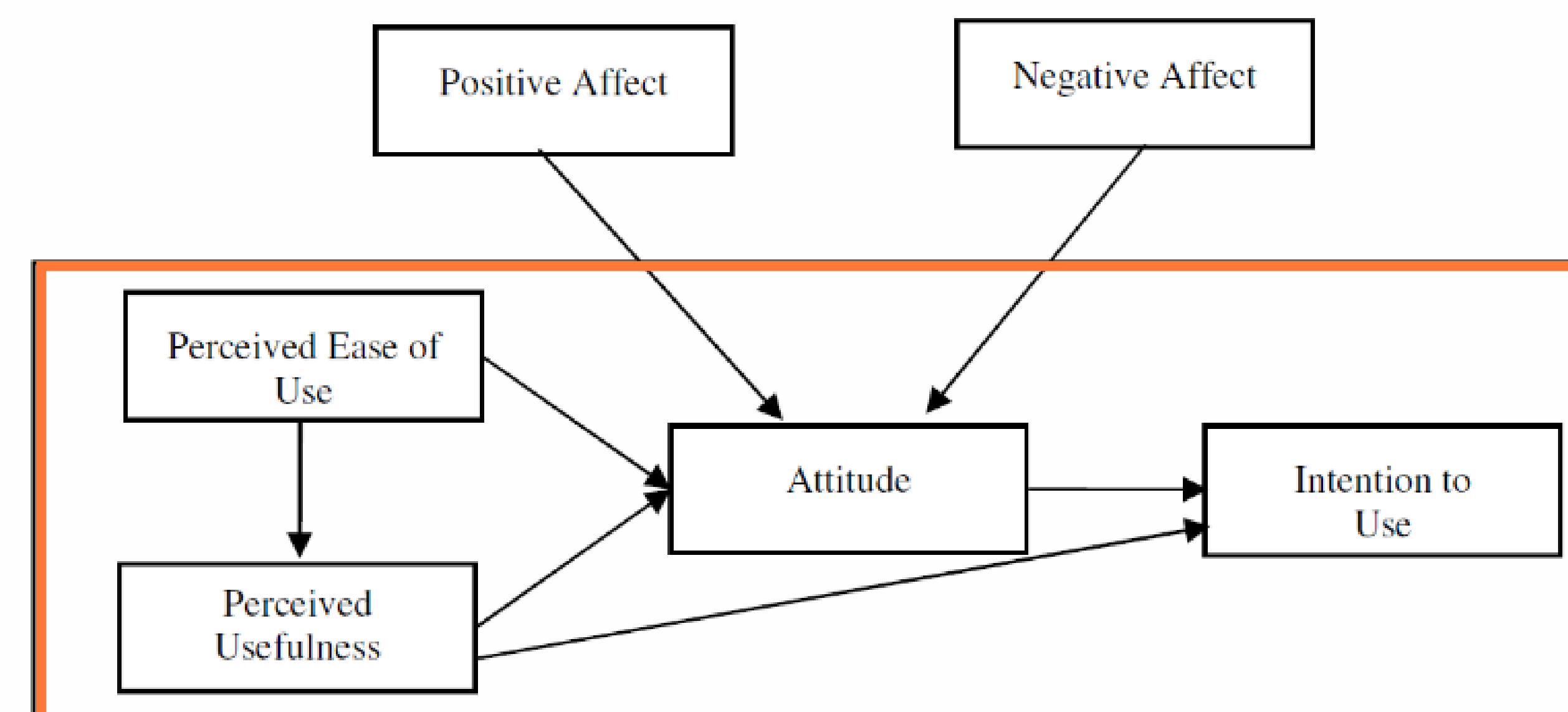
To verify a user logging into a system, identification and authentication must occur. Most often, the user is identified with their user ID name or number. The user then enters their password for authentication. Tokens, such as smart cards, may also be used as authentication. These methods examine what you know or what you have, while **biometrics examine who you are** [2].

## Research Hypotheses

- 1a. Intention to use voice authentication for PHR access is influenced by the users' attitude.
- 1b. Intention to use voice authentication for PHR access is influenced by the users' perception of its usefulness.
2. Users' perception of usefulness is influenced by their perception of the ease of use of voice authentication for PHR access.
- 3a. Users' attitude is influenced by their perception of the ease of use of voice authentication for PHR access.
- 3b. Users' attitude is influenced by their perception of the usefulness of voice authentication for PHR access.
- 4a. Users' positive affect influences their attitude towards voice authentication for PHR access positively.
- 4b. Users' negative affect influences their attitude towards voice authentication for PHR access negatively.

## Research Model

The combined TAM and Affect Theory model is shown below [5]. TAM is represented by the orange box in the combined model [3].



## Research Methodology

Two theories will be used for the research model. The Technology Acceptance Model (TAM) models user acceptance of information systems [3]. TAM identifies perceived usefulness and perceived ease of use as primary factors in a user's acceptance. These determine a user's attitude towards a system. Attitude and perceived usefulness determine a user's intention to use a system. This model has been validated in the computer technology field many times over.

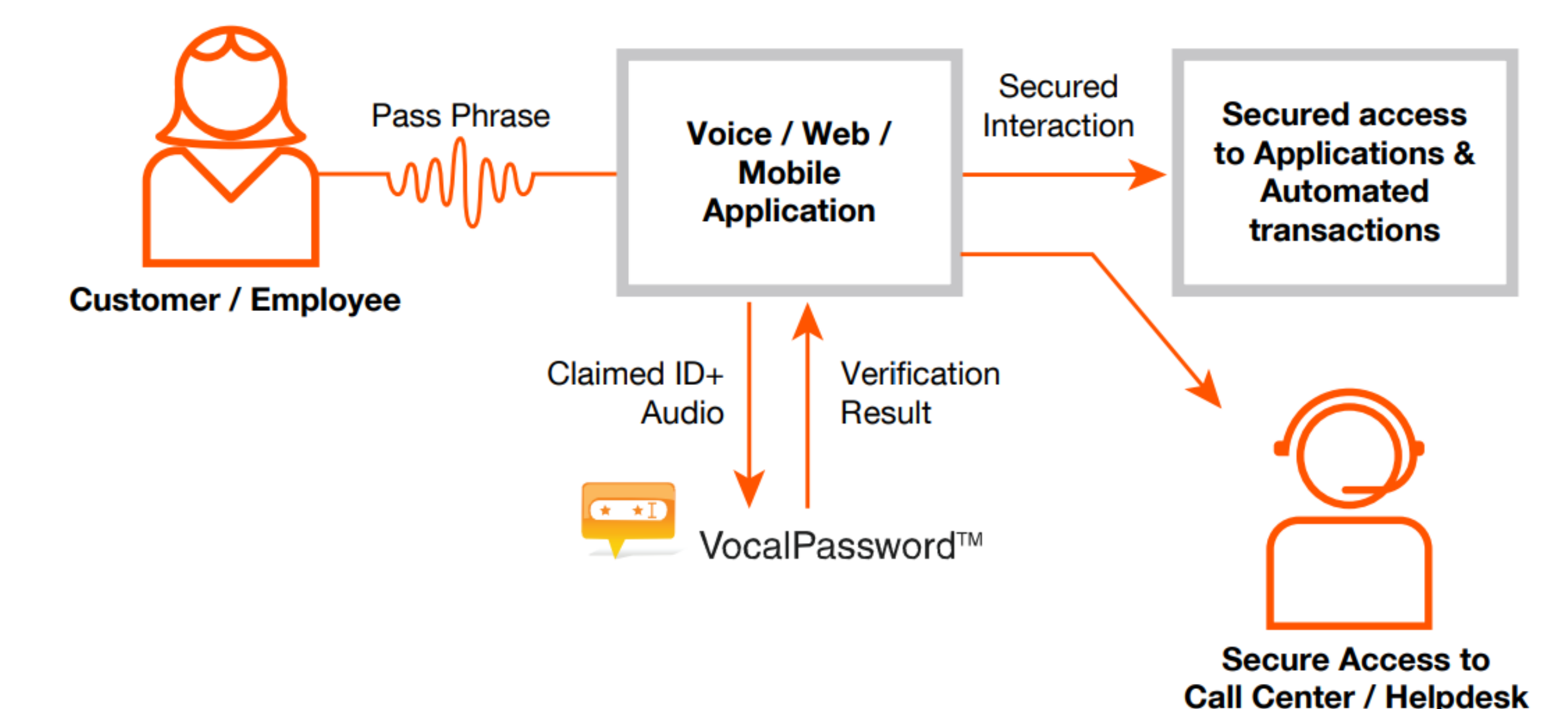
Affect Theory models how affect determines attitude. Affect is defined as a user's moods and emotions. Positive affects would include enjoyments or excitement, while negative affects include anger, disgust, or fear [4].

By combing these two theories, **affect and attitude can be measured to determine the user's acceptance towards voice authentication for PHR access** [5]. The research steps will be:

- Patients from clinic will be enrolled with voice authentication software to log into their PHR.
- Before enrollment, patients will complete the PANAS survey to measure their affect.
- When the patients return to clinic the following month, they will be given the TAM survey to complete.
- The combination of the surveys will be used to measure the patients' acceptance of using voice authentication for PHR access.

## Voice Authentication Technology

- Text-independent using natural speech
- **Text-dependent using a random passphrase** of digits and/or letters
- May be incorporated with a **webpage or a smartphone application**
- For verification, a new random passphrase is provided for the user
- The system compares the new sample to the voiceprint stored
- Random passphrase is difficult to record and imitate a user
- Playback detection for unnaturally matched audio segments
- Some security measures include:
  - Secured database access
  - Personal identifiable information and audio encryption
  - Controlled interface access
  - Fully maintained records of all voiceprint usages [6]
- The Vanguard Group [7, 8] uses Nuance VocalPassword software
- An visual representation of Nuance VocalPassword is below [6]



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