Title
Message Across: A word matching game for reward-based in-game behavior change

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Abstract

Even though several research previously assessed human decision making through games, it is crucial to understand what influences players to commit certain choices. This paper presents a local two-player word-matching game named Message Across, designed to allow both collaborative and competitive in-game behaviors, and study how to mediate different behaviors solely through the scoring system.

Keywords:
Message Across, Word-matching Game, In-game Behaviors

Platform(s)

Developed in Unity and tested on PC & Linux, although we could not deploy the game in our Linux distro, due to a multi-touch requirement.
Description

1. Introduction

Figure 1: Message Across in-game screenshot.

Recently, games have been applied to study individuals’ decision making in environments such as social dilemmas [1, 2]. However, these studies often focus in analyzing players’ decisions and strategies. Granting that decisions are often influenced by behaviors within and between individuals, we believe another important aspect to explore is the emergence and promotion of human behaviors through games.

Stepping on that direction, we developed Message Across. Message Across is a game developed with the goal of allowing both collaborative and competitive behavior when two players interact with each other. We wanted the game task to be as neutral as possible, so that the reward system could be modified to promote different types of in-game social interactions. This flexibility made the game appealing for studies involving social interactions. Notably, it has already been applied in recent research [3, 4].
2. Gameplay and Game Design

The setting for Message Across was developed around the metaphor of rhythm games as Guitar Hero\(^1\), so that it is both engaging and entertaining to play. A screenshot of Message Across is provided in Figure 1. The game was developed for touch screens, and players interact with it through virtual buttons positioned in each bottom side of the screen (areas A.1 and A.2 of Figure 1). An example of players interacting with the game is provided in Figure 2, and a link to a video of Message Across gameplay was added below\(^2\).

Through the course of the game, players try to complete words. Each level presents two words on the top of the screen, one for each player (areas B.1 and B.2 of Figure 1). The game contains three lanes (area C of Figure 1), as well as two markers, one for each player, arranged at the bottom of the lanes. In order to select a letter, the players must position their marker in the lane where the letter is rolling and select an action. When the letter collides with the marker, the selected action is performed. Only the first player that selects an action is able to perform it.

In order to design a neutral game task, we ensure that a word can be completed either by competitive or collaborative actions: each player can either take a letter (advance their own word) or give a letter to the other player (advance the other player’s word). Meanwhile, the score system is used to give feedback to the players, to bias their behavior, and ultimately to shape their interactions. For example, to promote individual behavior, the score system may exclusively value take actions. In contrast, to promote mutual help, the score system may equally value give and take actions. We implemented feedback animations \([5]\) to reinforce score changes (Figure 3).

\(^1\) https://www.ranker.com/list/guitar-hero-games/video-game-info
\(^2\) https://youtu.be/hAS9PUVaRIY
The score systems and maximum number of actions per level can be configured by the researchers. Each level ends whenever both players have no available actions. The player scores and available actions are displayed in the game interface, above the players’ buttons and below the players’ words (areas D.1 and D.2 of Figure 1).

![Figure 3: Message Across score change feedback animation. The left player got a 5 points score decrease and the right player got a 5 points score increase.](image)

3. Personalization

The game allows researchers to personalize most of its gameplay elements. Configurations are divided into three categories: general configuration, score system configuration, and level configuration.

The general configuration includes player UI colors, the number of available actions per level (defaulted to 4), initial scores, number of levels to execute before the game ends (defaulted to 7) and the ratio of random vs needed letters to spawn on the lanes of the center track (defaulted to 70%). Additionally, researchers can select what log mode to use, between DEBUG - logs are printed to the console - and MONGODB - logs are printed to an external MongoDB table, through a connector. Finally, general configuration also contains references to the user-defined score system versions, along with prefixes representing them. Researchers can select any score version in-game, by selecting its prefix in a menu displayed before the main gameplay (Figure 4). A configuration prefixed by T (Tutorial, implying no scores for any action) is always added by default.

The definition of a score system version is assessed by the score system configuration. The score attributed to a player after performing an action can be parameterized according to the action itself (give or take), whether the letter is useful for the player who performed the action or the other player, and whether the player who performed the action has a lower, equal or higher state of word completion than the other player. For example, the score system can reward a player who advances their task progression and punish the other player at the same time, when both players need the same letter (the score of one player increases by 5 points, and the score of the other player decreases by 5 points, as represented in Figure 3).
Finally, level configuration encompasses a list of available words to complete. Whenever a level begins, a pair of words is picked randomly from a list defined in this file.

4. Demo

The demonstration of Message Across requires a simple setup: a computer and a touch screen. Message Across is played by groups of two participants, each located at one of the sides of the screen (as represented in Figure 2). It is advisable that players first understand and master the game actions and rules through the default Tutorial score system. Afterwards, players can play with other score systems as many levels as the general configuration allows. While playing different versions of the game, players can be left free to interact.
References


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Website:

https://github.com/SamGomes/message-across