QUICKSTART GUIDE

INTRODUCTION

The **Virtual Human Project (VHP)** provides developers with a scalable, easy-to-integrate, and optimized package for procedurally animating realistic virtual humans in Unity. By following this guide, you will learn how to create a new preset using the dedicated tool to configure, save, and edit your character's facial expressions. You will also learn how to configure the core components of the toolkit to add emotions, select gaze strategies, and enable lip synchronization.

PREREQUISITES

This toolkit has been developed for **Unity 2020.3** or higher. To fully benefit from its features, you will need rigged characters with an appropriate set of blend shapes. Two demo characters (male and female) created using Character Creator 3 are included with the project. The demo project was designed to work with Unity High-Definition Render Pipeline, although it is not limited to this version.

TABLE OF CONTENTS

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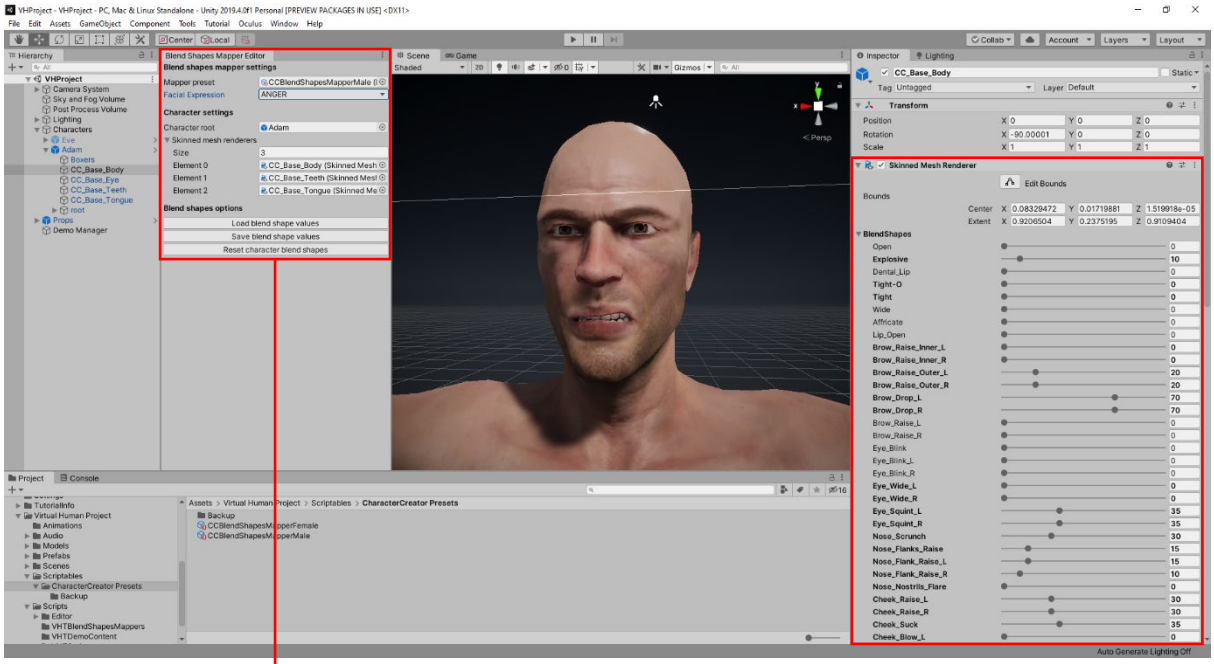
BLEND SHAPES PRESET

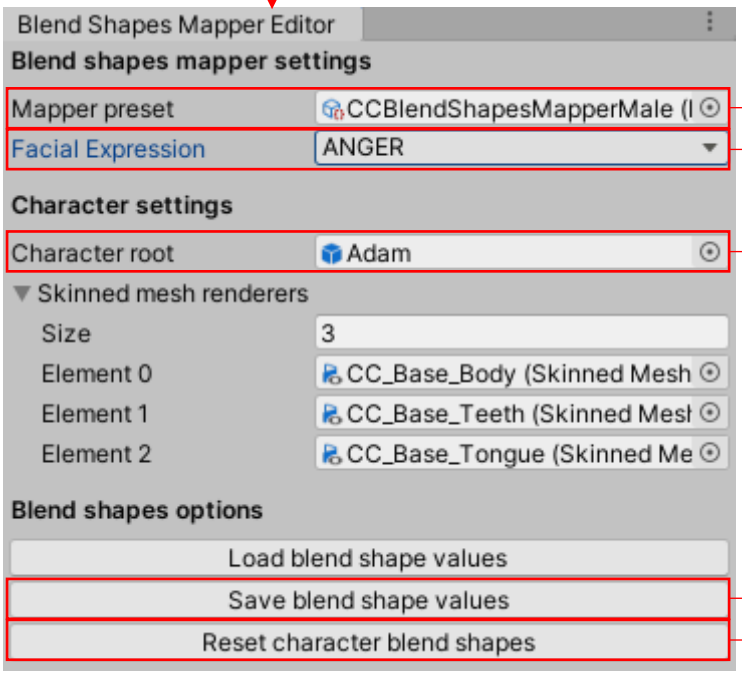
The first step, after importing your character, is to create a new preset to configure the facial expressions used by the runtime scripts for procedural animations:

1. Right-click in the Project window -> **Create** -> **Virtual Human Project** -> **Blend Shapes Mapper** (ScriptableObject).
2. Click on **Window** -> **Virtual Human Project** -> **Blend Shapes Mapper Editor**.
3. Drag and drop the ScriptableObject created in step 1 (1).
4. Select the facial expression to edit (2).
5. Drag and drop the root GameObject of the character (3). Skinned meshes with blend shapes should appear in the list.
6. Adjust the blend shape values to match the selected facial expression (4).
7. Save the current values using the **save button** (5).
8. After editing and saving the character's blend shapes, you can reset the values to configure a new facial expression from scratch by using the **reset button** (6).

Note: The created preset can be used for any character that shares the same set of blend shapes. However, depending on your character's morphology, you may need to adjust its facial expressions. To edit a preset, create a copy of the existing ScriptableObject and use the **load button** in the **Blend Shapes Mapper Editor** to edit the current values following the process outlined above.



(4) Adjust blend shape values



(1) Blend shapes mapper preset

(2) Facial expression to edit

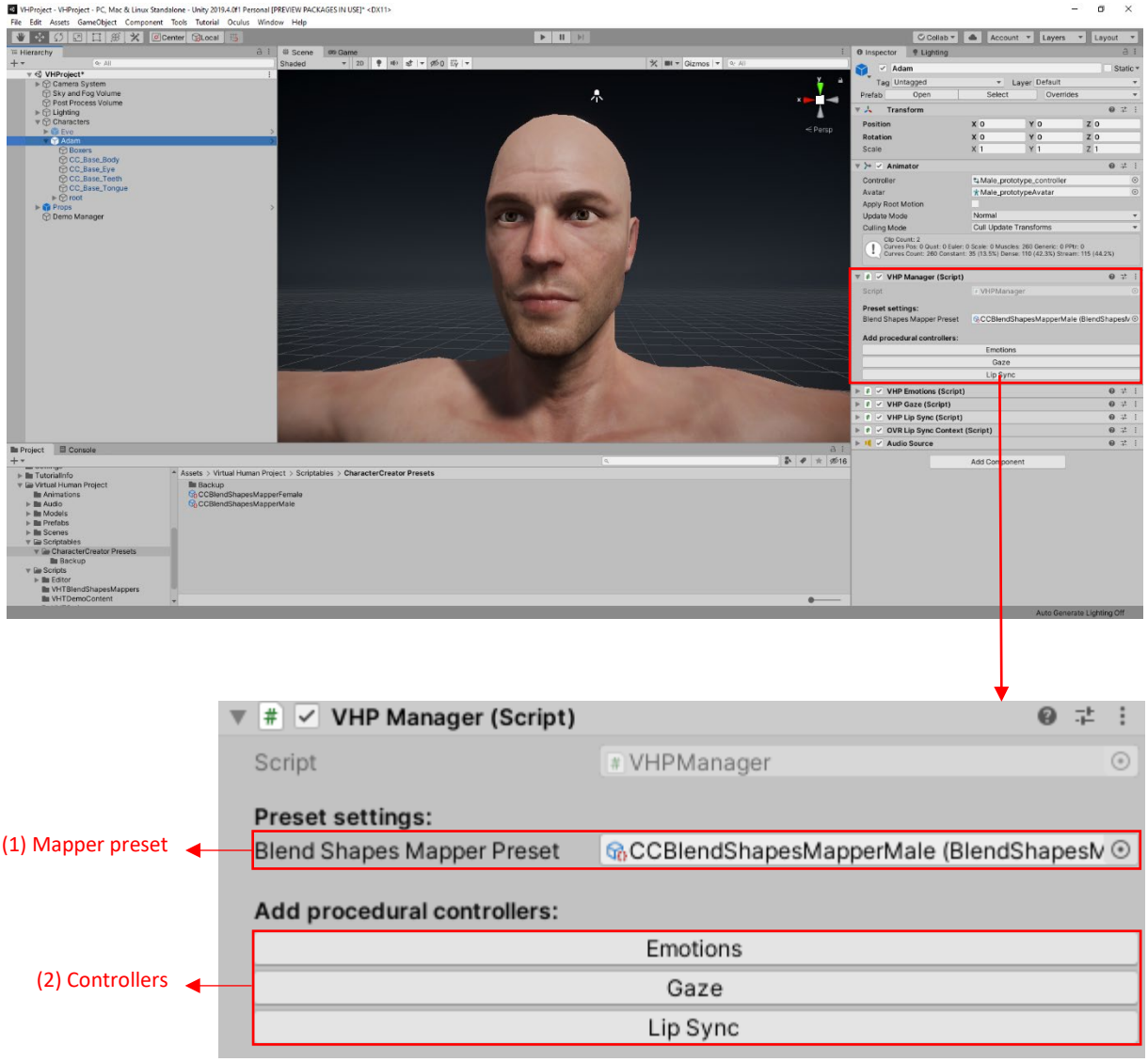
(3) Character root GameObject

(5) Save current blend shapes

(6) Reset blend shapes

CHARACTER MANAGER

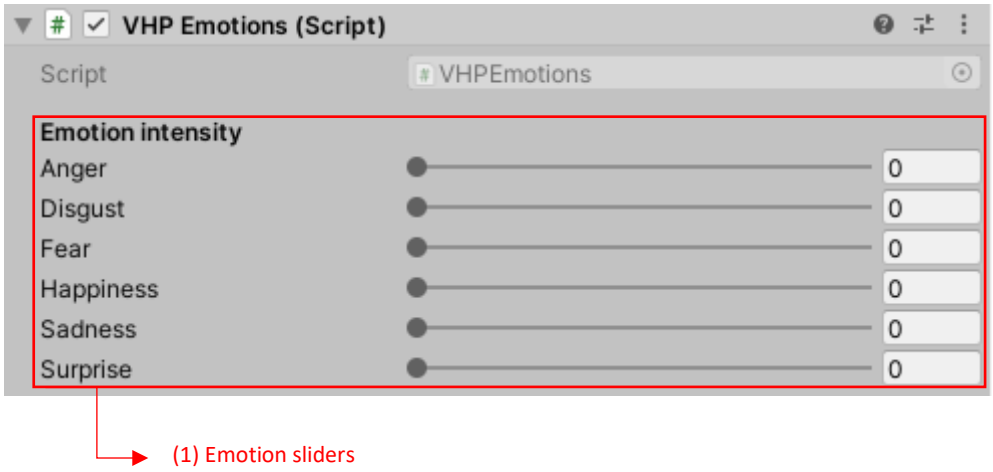
The first step to animating your character is to add the **VHPManager** component to its root GameObject. Once the script is added to your character, you can then drag and drop the previously created **Blend Shapes Mapper** (1) into the appropriate field. Next, use the provided buttons to add the necessary **emotions**, **gaze**, and **lip sync** controllers (2). As you add these controllers, the required components will be automatically instantiated.



EMOTIONS

The **VHPEmotions** script allows you to modify your character's facial expressions based on Ekman's basic emotions[1]. In Play mode, you can manually adjust the emotions using the sliders in the **Inspector** window. This will dynamically load the preset values stored in your **Blend Shapes Mapper**.

The public emotion fields are accessible via code, enabling you to change the character's emotional state based on the needs of your application. Keep in mind that emotion values are mutually exclusive — only one emotion can be active at a time.



[1] Ekman, P. (1999). Basic emotions. *Handbook of cognition and emotion*, *98*(45-60), 16.

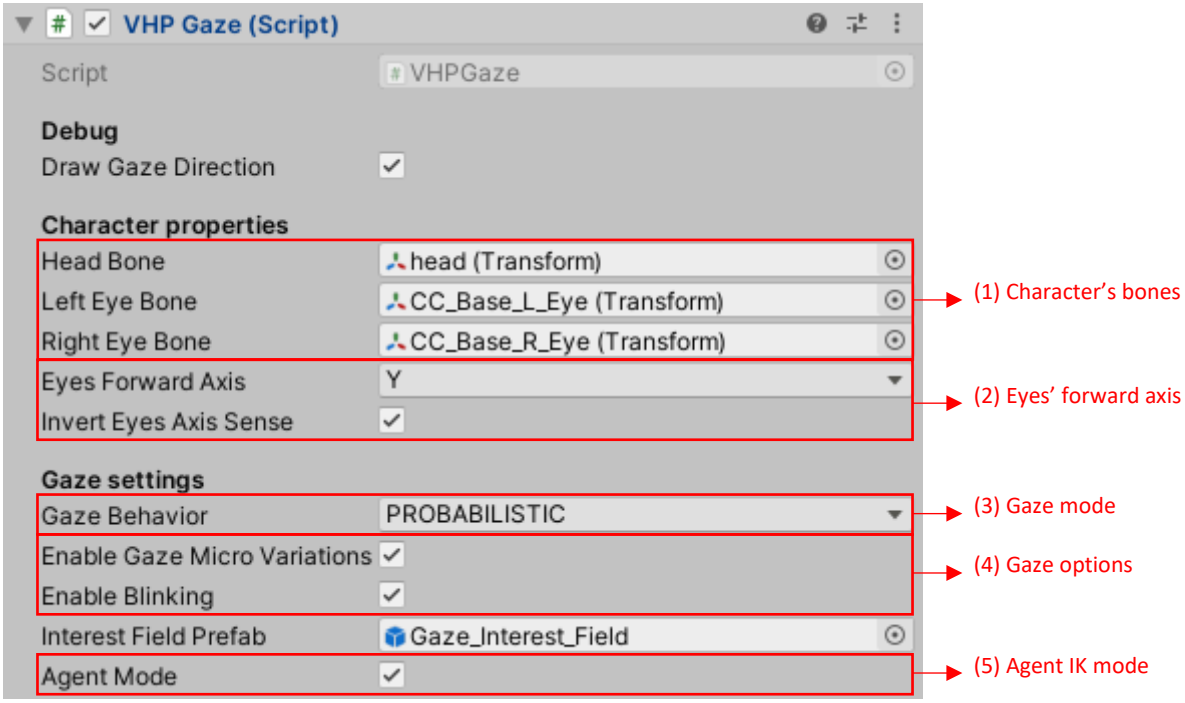
GAZE

Using the **VHPGaze** script, you can select one of four gaze strategies. To ensure compatibility with multiple rigging templates, you first need to assign the character's **head bone**, **left eye bone**, and **right eye bone** (1), as well as their forward axis direction (2).

Then, you can choose one of the following gaze strategies (3):

1. **Static**: Static gaze orientation that aligns with the character's forward direction.
2. **Random**: Gaze orientation modification with variable frequency and duration based on random positions within the character's field of view.
3. **Scripted**: A fixed target position controlled via a scriptable object.
4. **Probabilistic**: Automatic probabilistic target ponderation based on distance, sound proximity and volume, and movement velocity. (Scene configuration is required and explained in the next section.)

You can also enable **micro-saccades** and **blinking** options without affecting the selected gaze mode (4). Finally, enabling **Agent Mode** (5) activates inverse kinematics (IK) to adjust the character's upper body rotation based on the target location. (Ensure that IK Pass is enabled in the Animator settings.)

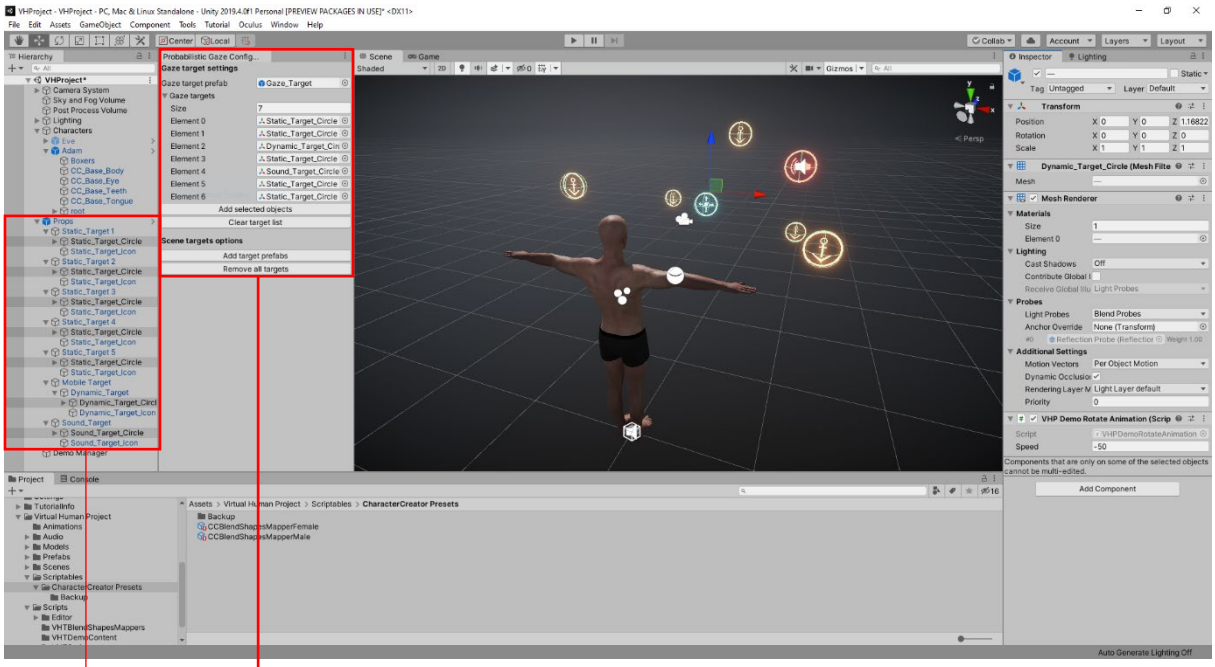


PROBABILISTIC GAZE CONFIGURATION

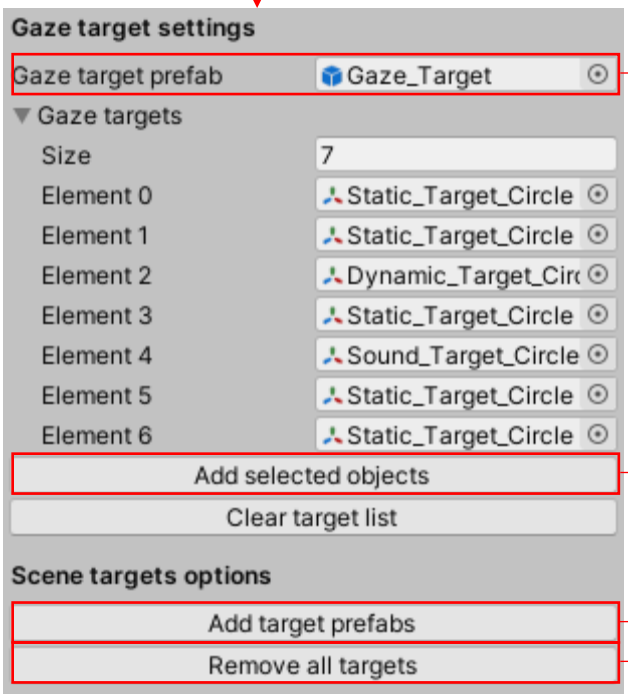
If you plan to use the probabilistic gaze mode, you must configure the scene first:

1. Click on **Window -> Virtual Human Project -> Probabilistic Gaze Configurator**.
2. The **Gaze_Target** prefab (1) should be automatically added from the project resources.
3. Select all the 3D objects you want to be considered as potential targets from the hierarchy window (2).
4. Add the selected GameObjects to the target list using the **Add selected objects** button (3).
5. Instantiate the target prefab using the **Add target Prefab** button (4). A child GameObject will be added with a collider scaled to the bounds of the mesh renderer. You can also add additional targets manually if needed. A GameObject can contain multiple targets.

Note: The collision matrix of the project is automatically updated to disable collisions between targets and other GameObjects in the scene. All instantiated targets can be removed from the scene using the **Remove all target** button (5).



(2) Potential 3D targets



(1) Gaze target prefab

(3) Add selected objects to the list

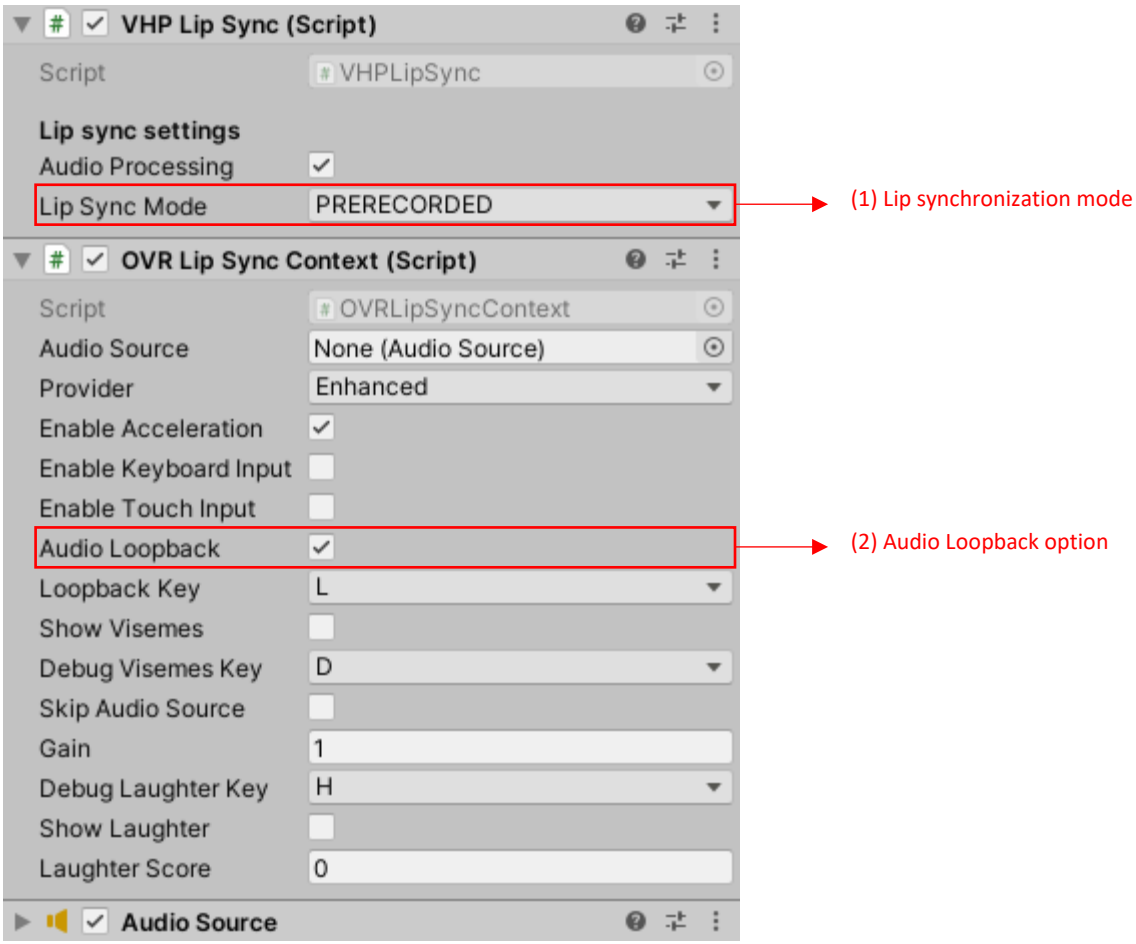
(4) Target prefab instantiation

(5) Remove targets from the scene

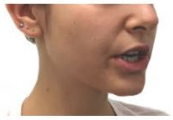
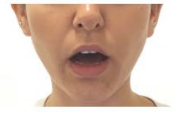
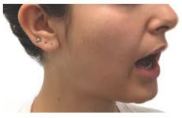
LIP SYNCHRONIZATION

The **VHPLipSync** script allows for lip synchronization based on both pre-recorded audio clips and real-time microphone input. You can select the lip synchronization mode using the **Lip Sync Mode** public field (1). Don't forget to turn on the **OVR Audio Loopback** (2) if you need to hear your microphone in play mode.

Note: To properly set your viseme presets, please refer to the reference card available in the appendix (also available as a PDF file in the project folder).



APPENDIX: VISEMES REFERENCE CARD

Viseme Name	Phonemes	Examples	Mild Production	Emphasized Production	3/4 Rotation
sil	neutral	(none - silence)		None	
PP	p, b, m	put, bat, mat			
FF	f, v	fat, vat			
TH	th	think, that			
DD	t, d	tip, doll			
kk	k, g	call, gas			
CH	tS, dZ, S	chair, join, she			
SS	s, z	sir, zeal			
nn	n, l	lot, not			
RR	r	red			
aa	A:	car			

aa	A:	car			
E	e	bed			
I	ih	tip			
O	oh	toe			
U	ou	book