The Process Book of Reconcile

A FILM BY XIAOTONG LIU

The Process Book of *Reconcile*

A Thesis Submitted to Faculty of the Animation Department
in Partial Fulfillment of the Requirements for the
Degree of Master of Fine Arts in Animation

at

Savannah College of Art and Design

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To ensure the clarity and grammatical accuracy of this paper, I used Grammarly (https://www.grammarly.com/)

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Abstract

The Process Book of Reconcile

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A man and a woman interacting: "*Reconcile"*, explores relationship dynamics through a speechless narrative focused on physical human interaction. Using visual metaphors like boxing matches, kitchen fights, and banquet dances, *Reconcile* examines the changing relationship—from hostility to intimacy—revealing how emotions influence their behaviors. The project uses exaggerated, almost grotesque animation to capture rapid body movements and facial expressions, conveying both conflict and affection. By presenting the complex interpersonal relationships between men and women from the third-person perspective of the children, *Reconcile* explores the influence of parents' relationships within the family on the children's growth, as well as the children's reactions.

Keywords : Reconcile; Family; Relationship; Generation; 3D Character Animation


INTRODUCTION

Artist Statement

Fig. 1. *Photo with The Bad Guys from CTN,* Xiaotong Liu, 2022, (Konja Liu's personal portfolio, https://konjaliu.com/about-me).

I'm Konja Liu, 3D animator. At the forefront of merging art with technology, my journey as a 3D Animator at Savannah College of Art and Design has been about pushing the boundaries of storytelling in Animation. Guided by Professors Bill Tessier, Pedro Coronado, and Kane Garrett at SCAD, I have honed my skills to captivate audiences with my Animation Works, blending narrative with visual artistry.

Education shapes my creative approach, with my ongoing MFA studies in Animation including Animating, Modeling, Rendering, Texturing, Lighting, etc. at SCAD refining my craft. My graphic design foundation from Jiangnan University has laid a solid foundation for my understanding of visual communication, which I apply in creating engaging content.

Partnering with students from the multidisciplinary departments, my team crafted a character-driven animated film, harnessing the power of Unreal Engine for immersive cinematics and character animation. The drive to enrich audiences' experiences through innovative animation, and body and facial animation is what propels my work. Working on my interdisciplinary animation project, *Reconcile*, I combined my knowledge and skills with the demands of shot production using an industry-inspired pipeline.

I really love the feeling of challenging problems and progressing with a team to create something incredible, and make artwork change viewers or even influence them in some way. At the same time, the relationships and connections built between team members make me feel alive.

Despite how far I have traveled to attend school in Savannah, I feel very much at home here from the moment I set foot in the animation department. I think the life I have prepared during this period is the life I want, and it is for the sake of art and my own life. To use my favorite sentence to describe what animation is: Animation is not alive, it certainly needs animators to devote their energy to bring animated characters to life and make them come alive.

Thesis Statement

Reconcile is a character study in human behavior and interaction. A man and a woman express a range of positive and negative emotions about each other in a very physical manner. Through the sharp contrast between negative and positive emotions, it highlights the expected parent relationship from the child's perspective. The film aims to inspire the viewers to focus more attention on the children in real life and listen to their thoughts.


RESEARCH

Case Study 1 - *Nimona*

Fig. 2. Screenshot of Ballister and Ambrosius, *Nimona*, directed by Nick Bruno and Troy Quane, 2023, (Netflix, https://www.netflix.com/).

Fig. 3. Screenshot of Ballister and Ambrosius, *Nimona*, directed by Nick Bruno and Troy Quane, 2023, (Netflix, https://www.netflix.com/).

The design of character movements is often related to shot size and camera angle. Different shot compositions and environmental designs will affect the emotions of the characters within the shots. When it comes to emotional conflicts and struggles between two sides, the first thing that comes to my mind is the confrontation between Ballister and Ambrosius in *Nimona*. These two characters in figure 3 are positioned at opposite ends of the scene. There are physical and psychological barriers between them. At the same time, the composition emphasizes separation and opposition. The film uses a wide-angle lens to show a sense of distance, and the contrast between colors, lights and shadow is intense. All of these visual components symbolize the trust gap and confrontation that often occur after the breakdown of a relationship. The two were completely separated by past scars, such as the incident of losing an arm, and by current misunderstandings.

In figure 2, the characters engage in close combat with constantly shifting positions and power changes. The action design combines the similar attack methods of these two characters with the over-the-shoulder shot, creating emotional tension between their unbreakable bond and irreconcilable conflict. This face-to-face standoff uses close-ups of the face to capture the eyes and emotions, and highlighting dialogue or breathing sounds.

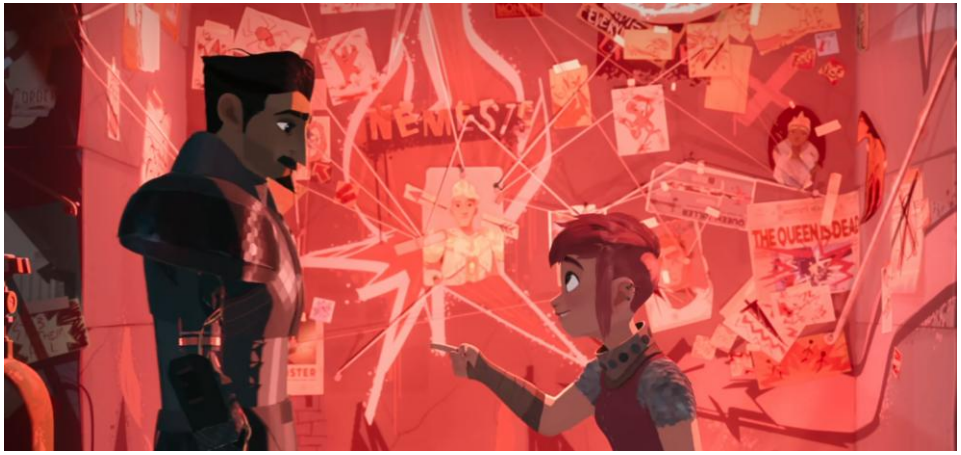


Fig. 4. Screen shot of Ballister and Nimona, *Nimona*, directed by Nick Bruno and Troy Quane, 2023, (Netflix, https://www.netflix.com/).

Fig. 5. Screen shot of Ballister and Nimona, *Nimona*, directed by Nick Bruno and Troy Quane, 2023, (Netflix, https://www.netflix.com/).

At the same time, lighting also plays an immeasurable role in shaping the relationships between characters and the emotions of the characters. In *Nimona*, the confrontation and reconciliation between Ballister and Nimona, figure 4, are at the core of the film's themes of trust, alien identity, and self-acceptance. Their interaction can demonstrate how lighting reflects the emotional undercurrents of the moment, especially when Nimona intrudes into Ballister's hideout and eventually forms an alliance. The visual language of the light and shadow, skillfully externalizes this complex emotional process. In their dialogue, the characters' faces are often in a half-bright and half-dark state, directly presenting their contradictions and hesitations, like in figure 5. When Ballister understands Nimona, the position and color temperature of the main light source in the scene changes, gradually blending from the cold blue and white tones into the warm amber, hinting at the warming of emotions towards each other.

However, when Ballister and Nimona are in a confrontation, Ballister and Nimona are often separated by light sources of different natures, such as Ballister’s natural light vs. Nimona's magical light effects, visualizing their barriers. When relations ease, both sides start to "share" the same kind of light. The scene change from showing the contrast of light tones of the characters in the scene to the process of these two characters integrating into a unified color scheme, accompanied by their mutual acceptance.

Case Study 2 – *LadyBug CatNoir*

Fig. 6. Screen shot of Adrien Agreste and Marinette Dupain-Cheng, *LadyBug CatNoir*, directed by Jeremy Zag, 2023, (Netflix, https://www.netflix.com/).

Fig. 7. Screen shot of Adrien Agreste and Marinette Dupain-Cheng, *LadyBug CatNoir*, directed by Jeremy Zag, 2023, (Netflix, https://www.netflix.com/).

How to combine the intimate and complex emotions inside with the intense physical conflicts outside is the problem that *Reconcile* needs to solve. In the animation *LadyBug CatNoir*, the rooftop dance fight scene is the key scene that shapes the relationship between these two characters. It skillfully transforms confrontation into a dance, allowing emotions to gradually progress between their combat. This scene in figures 6 and 7 takes place on the rooftops of Paris under the moonlight. The villain‘s abilities force these two to engage in a “deadly dance”. The brilliance of this plot lies in its metaphor of the intense combat scene as a kind of dance performance that reflects the inner worlds of these two characters. This causes the tense atmosphere and the intimate mood to blend together.

From attack blocking to standard dance moves such as hand-holding, spinning, and lifting in figure 7. The body gradually relaxed and cooperated smoothly after being tense and stiff. The reduction of physical distance and forced cooperation has broken the conventional combat distance and created continuous close contact. The gradual physical synchronization is a silent metaphor for mutual acceptance and trust in emotions. These lines swing between duty and personal emotions. All close-up shots, like figure 6, focus on each other's facial expressions of gazing, surprise, and smiling. The continuous gaze fixed beneath their masks established a direct emotional channel, transforming public battles into private moments, and intimate emotion grew in the gaze.

Fig. 8. Screen shot of Adrien Agreste and Marinette Dupain-Cheng, *LadyBug CatNoir*, directed by Jeremy Zag, 2023, (Netflix, https://www.netflix.com/).

Fig. 9. Screen shot of Adrien Agreste and Marinette Dupain-Cheng, *LadyBug CatNoir*, directed by Jeremy Zag, 2023, (Netflix, https://www.netflix.com/).

The background music often shifts from tense and suspenseful to romantic waltz to match the emotional atmosphere. Moonlight and city lights create a stage-like atmosphere, and slow-motion and rotating shots emphasize the elegance of the movements and the condensation of emotions. The transformation of music, light, and shadow redefins the nature of the scene, from the battlefield to the dance floor in figures 8 and 9.

The camera language encourages audiences to focus on emotions rather than victory or defeat, creating a sense that only these two characters exist in the world. The responsible nature of LadyBug, Marina, contrasts with the romantic playfulness of Black Cat, Ai Jun, in this moment.

These two interacted without knowing each other's true identities. Their disguises allow them to reveal the emotions that they had suppressed in their ordinary lives. Black Cat took the opportunity to express his love, while LadyBug struggled between her sense of duty and infatuation. The tension created by their identities made the ambiguity of their situation particularly intense.

Case Study 3 – *Boss Baby*

Fig. 10. Screen shot of Tim Templeton, *Boss Baby*, directed by Tom McGrath, 2017, (Netflix, https://www.netflix.com/).

Fig. 11. Screen shot of Ted Templeton, *Boss Baby*, directed by Tom McGrath, 2017, (Netflix, https://www.netflix.com/).

What determines a person's character is often their actions rather than their physical appearance. In *Boss Baby*, the success of the expression animations of Tim and Ted lies in precisely depicting the fundamental contrast between the "innocent child" and the "sophisticated soul" in character design through completely different performance systems. Animators can learn a great deal by studying Tim and Ted's different emotions and motivations behind their speech and body languages. This provides an excellent learning model for animators.

Tim Templeton looks like a teenager on the outside but is a seasoned "adult" on the inside in figure 10. His expression is a tool to achieve his goals, which are persuasion, pressure, ridicule, and disguise. The expression is wide open and the facial features, especially the eyes and mouth, have a large degree of distortion, and the body language is rich. The expression often maintains a kind of "controlled exaggeration". The key point is the contrast between the adult-like eyes, raised eyebrows, pursed lips, and the teenager's round face.

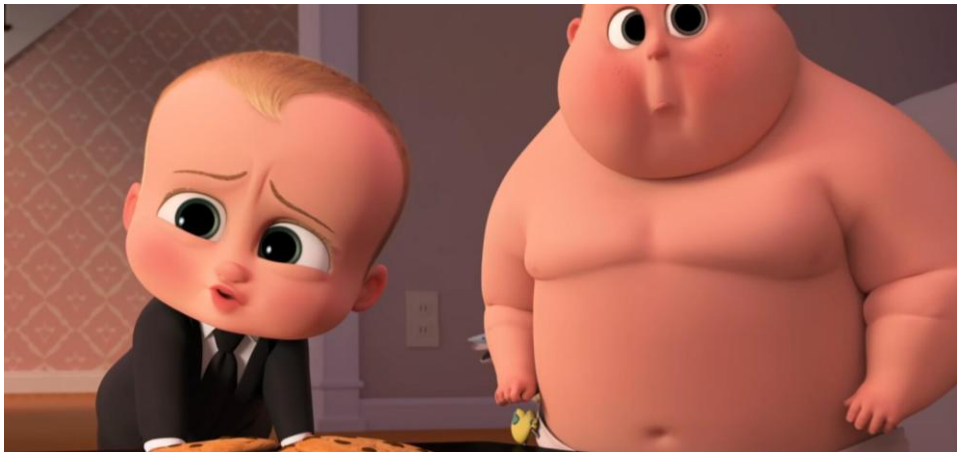


Fig. 12. Screen shot of Jimbo and Ted Templeton, *Boss Baby*, directed by Tom McGrath, 2017, (Netflix, https://www.netflix.com/).

Fig. 13. Screen shot of Tim Templeton and Ted Templeton, *Boss Baby*, directed by Tom McGrath, 2017, (Netflix, https://www.netflix.com/).

Ted's expression perfectly uses classic principles such as Squash and Stretch which help to convey the character's youth and cartoonish qualities. For instance, in figure 11 and 13, when extremely astonished, the eyes will open so wide that they almost fall off the face shape, the mouth will form a standard "round or slightly open" shape, and the entire head may lean back, creating a cartoonish sense of shock. When Ted shows an innocent expression in figure 12, the changes in his expressions are not only reflected on his face, but his gesture and tones of speech also exaggerate accordingly. This internal and external interaction makes his emotions resonant by audiences.

Excellent expression animations are not mechanical movements of facial muscles, but "character performances". Ted embodies an "experiential" style, while Tim adopts a "methodical“ approach. Make good use of the rhythm difference, fast change vs. slow change, and the amplitude difference, exaggeration vs. restraint, to shape character relationships and comedic effects. One should not only master Ted's style of emotional exaggeration and outward expression, but also refine Tim's style of control and restraint, choosing techniques based on the characters’ inherent logic. Overall, the expression animations in *Boss Baby* prove that technology serves the essence of the characters. When animators are practicing, they can separately extract the performance clips of Tim and Ted for copying and analysis, focusing on understanding the driving logic behind them. This kind of practice method has also greatly assisted me in understanding and developing my skills in character performance.


PRE-PRODUCTION

Story Beats

Intro_01: The climax of a movie film plot, Male and Female protagonists (introduce characters) are in hostile camps, mutual hatred, and they are fighting...

Turning_02: When the male and female protagonists are about to hurt each other

(Glitch) (Off-TV child turns on children's mode with remote control) Enemy → Couple

The male protagonists suddenly does action error, and finally they create a vibe which is warm and romantic (wall bam, lying on female body...)

Conflict_03: When they are about to kiss, the Male sneezes, which is a mistake and ruin the vibe they have.
The Female gets angry, and these two quarrel and fight again. The plot is moving in the direction of conflict and violence...

Female knocks the Male down, and just before she slays

(Glitch) (Off-TV child turns on children's mode with remote control) Enemy → Couple

Female reaches out to pull up the Male, and vibe turns to warm and intimate again...
They start to realize that something is wrong, and realize they are actually enemy...

Climax_04: They try many times and find that no matter how hostile they are, eventually the pair will become harmonious and intimate... Enemy → Couple
(Change scene costume - hostile identity, weapon...

So they realize someone is outside their “world”, and they try to find the “camera”
Angrily interact with child

End_05:Scare the kid into dropping the remote control. (The purpose of child using the remote control is to prevent their relationship being so bad.)
Zoom Out TV, and the child’s parents are arguing and fighting...

Children try to use the remote control to stop their parents (they are not going to change their relationship because of the remote control)
Finally, the parents grab the remote control and turn off the TV

Character Selection

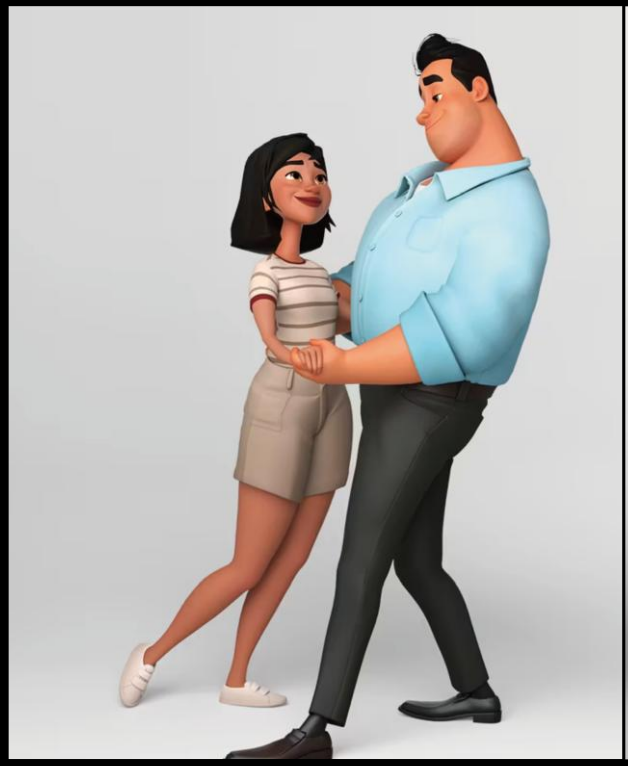


Fig. 14. Daniel and Megan from Downloads, 2024, (ProRigs, https://prorigs.com/account/downloads/family-rigs/).

Parents (in TV)

Fig. 15. Chris from Downloads, 2024, (Prorigs, https://prorigs.com/account/downloads/family-rigs/).

Child (off TV)

In order to more clearly and vividly depict the opposing positions of the characters within the family, whether in terms of power or gender, I chose male and female characters with significant body differences as the parent figures. In figure 14, the male character has a larger upper body structure and a more slender lower body shape. The strength of the male is mainly concentrated in the upper body. In contrast, the upper body of the female characters is relatively weak, but the lower body is relatively broad, highlighting that the strength of women is concentrated in the lower part. Such a choice of characters also laid the groundwork for where their different attack points come from in the plot arrangement. Female character tends to use more leg attacks, while male character tends to use more hand attacks.

A cartoony style clearly appears in the child rig and the Daniel and Megan rigs for the film. The choice of the child rig (Fig. 15) was also based on the style of the film. The film contains both adult animation and children's animation, as well as male animation and female animation. Therefore, film can cover all aspects of character animation and also reflect the technical ability of the 3D animator.

Character Modification

In order to enhance Daniel rig's artistic expression and the cinematic aspirations of the film as much as possible in terms of color scheme and material effects, I re-created all of his materials in Substance Painter, and they were all prepared for importing into Unreal.

In figure 16, I applied a color contrast on the hair, aiming to fully display the layers and texture details of Daniel‘s hair. This approach also created a natural, gradual transition from the hair roots to the tips. It is very effective in visually distinguishing the role of hair when applying the Secondary Animation. By adding a Black Mask, Generator, and Filter to the layers in Substance Painter, as can be seen in figures 17 and 18, I applied the Ambient Occlusion and Position Color Map effects to Daniel's clothes. This can add a sense of thickness to the original material that only has a base color. Additionally, to enhance the transparency of the skin, I added a scattering channel, along with scattering curvature and scattering thickness into his body material layers.

Fig. 16. *Daniel’s Texture Modification in Substance Painter,* Xiaotong Liu, 2025, digital, 1132 x 1088 pt.

Fig. 17. *Daniel’s Texture Modification in Substance Painter,* Xiaotong Liu, 2025, digital, 1414 x 1082 pt.

Fig. 18. *Daniel’s Texture Modification in Substance Painter,* Xiaotong Liu, 2025, digital, 1417 x 1040 pt.

The texture and wear of a material can reflect a character‘s social class, historical background, and the cultural context of their world. A clean and uniform material may make a character seem lifeless, while appropriate wear and stains can enhance their authenticity. Wear follows physical logic - areas that are frequently moved and rubbed, such as elbows, knees, cuffs, collars, and pocket edges, will fade, fray, or even develop holes first. Stains will also be distributed according to the type of activity and the direction of gravity.

The sense of story behind the characters brought about by more detailed material aspects can be seen in figures 19 and 20. By adding masks and attaching the grunge texture to the grayscale attribute, the degree of wear was added to Daniel's clothes, pants, shoes, and even his belt. Through Daniel's clothing, I aim to convey to the audience the impression that this person actually works very hard and represents a real-life parent role in our lives.

Fig. 19. *Daniel’s Texture Modification in Substance Painter,* Xiaotong Liu, 2025, digital, 1152 x 1044 pt.

Fig. 20. *Daniel’s Texture Modification in Substance Painter,* Xiaotong Liu, 2025, digital, 2746 x 1144 pt.

Relationship of Parents Study

Fig. 21. *Screen shot of the Kiss posture of Daniel and Megan,* Xiaotong Liu, 2024, Maya, 479 x 681 pt.

Kiss

Fig. 22. *Screen shot of the Hug posture of Daniel and Megan,* Xiaotong Liu, 2024, Maya, 504 x 681 pt.

Hug

Fig. 23. *Screen shot of the chokehold posture of Daniel and Megan,* Xiaotong Liu, 2024, Maya, 475 x 681 pt.

Chokehold

Hostile, Intimate, Hatred, Hate, Adore, Love...

Relationship of Parents Study

The topic of male-female relationships and intimate connections has always been one that people are keen to discuss in social media. What kind of interaction and emotional communication will lead to what kind of relationship status between men and women is the main direction I aim to explore. The dynamic changes in male-female relationships also reflect the emotions of parents in different family situations and the reasons for their behaviors. To give some background information, back in 1962, Jerold S. Heiss wrote an article in *Sociometry* 25 where he proposed that across different socialization processes, relationships between the two sexes, men tend to have a more dominant position, while women more frequently exhibit a strong need for obedience. If all people acted in accordance with the role that best suited their personalities, then men would be more likely to become leaders.[1] However, this is now a thing of the past. More and more independent and outstanding women have become the main leaders of their families. In real life, due to various factors such as family status and parental roles, in many situations, women do not need to listen to men. For instance, in matters related to raising children and managing the family, women even need to express their wishes and demands more strongly. This results in a conflict between the position of men as leaders on traditional level and women's strong desire to express themselves.

Building on the preceding discussion, the contradiction between men's tendency toward a dominant leadership role and women's strong need for self-expression in some family spheres often becomes a direct trigger for marital conflict. Mothers make decisions more from the perspective of caring for their children, but fathers do not think the same way sometimes. Rosemary L. Hopcroft's research showing that females invest more resources in their offspring without any doubts, suggests we should expect evolved traits in women that promote stronger maternal responsibility to children.[2] In some families where men are the main source of income, such conflicts typically happen around decision-making processes. For example, when it comes to major financial investments or long-term family planning, the husband may instinctively assume the final say, viewing himself as the natural leader. Meanwhile, the wife, drawing on her daily experience managing household expenses and childcare, may have equally firm opinions and refuse to yield.

Fig. 24. Couple kissing, 2025, photography, (Pinterest, https://www.pinterest.com/search/pins/?q=couple%20kiss&rs=typed).

Fig. 25. Couple Arguing, 2025, photography, (Pinterest, https://www.pinterest.com/search/pins/?q=Couple%20arguing&rs=typed).

1. Jerold S. Heiss, "Degree of Intimacy and Male-Female Interaction," *Sociometry* 25, no. 2 (1962): 198.
2. Rosemary L. Hopcroft, "Gender Inequality in Interaction: An Evolutionary Account," *Social Forces* 87, No. 4 (2009): 1847.

Since *Turning Red* (Fig. 26) appeared and received a positive response, both live-action and animated films have moved towards the theme of intergenerational and family issues. More and more animations are consistent with the label classification of parent-child families. The reason is that animation companies are planning to attract more viewers to gain profits while producing excellent animations. This is not a circle of malignancy, but the same animation content can reflect and touch the thinking layers of viewers of different ages and cultures. Animation on the theme of family relations is often based on life, so it is closer to life, and can obtain more emotional resonance and reflection after viewing. Despite this, most of these animation works, like figure 27, describe the main contradictions between children and parents from the perspective of children, but in fact, there are also conflicts between parents that are affecting children. Kirkorian argues that a substantial body of research links environmental factors, especially a sensitive and stimulating home environment, to children's cognitive, academic, linguistic, and social outcomes. They further emphasize that social interactions with family, peers, teachers, and others are among the most critical influences on development.[3] The behavior of children in the face of parental disputes is also a highlight of the family theme. *Reconcile* also intends to present from the child's perspective how the child reacts to parental conflicts before growing up. It calls for creating a harmonious and loving environment for the child's growth.

Fig. 26. Screen shot of Meilin Lee and her family, *Turning Red*, directed by Domee Shi, 2022, (Pinterest, https://i.pinimg.com/1200x/44/47/b7/4447b792e70c19ece19fd8943b339353.jpg).

Fig. 27. Screen shot of Ellian and her parent, *Spellbound*, directed by Vicky Jenson, 2024, (Animation World Network, https://www.awn.com/sites/default/files/styles/original/public/image/attached/1077967-nextonnetflixanimation20240416-1280.jpg?itok=S25nX7Ia).

3. Kirkorian et al., "The Impact of Background Television on Parent: Child Interaction," *Child Development* 80, No. 5 (2009): 1351.

Beat Board

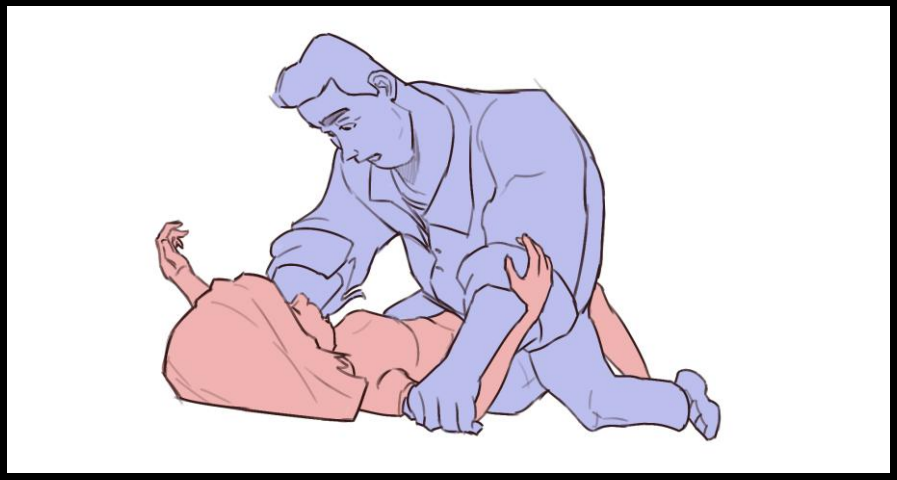


Fig. 28. *Daniel and Megan in Beat Board of Reconcile,* Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

Fig. 29. *Daniel and Megan in Beat Board of Reconcile,* Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

During the Beat Board stage, it is about exploring as much as possible the emotional relationship and pose of the two characters to make inspirations for the subsequent storyboard and Animatic. At the same time, make the personalities and colors of the two people clearly visible, highlighting the stronger and weaker party in terms of strength and emotion (Fig. 28 and 29).

At this stage, it's time to start thinking about how to express the emotions of the Golden Pose and the Blocking Pose in the subsequent animation plot. This includes the positive and negative shapes of characters' bodies and shot composition . Stéphanie shows that context plays a key role in both emotion recognition and the understanding of irony. Furthermore, when characters display emotional postures, viewers perceive stronger emotions and find the animations to be more realistic.[4]

4. Stéphanie et al., "The Role of Body Postures in the Recognition of Emotions in Contextually Rich Scenarios," *International Journal of Human-Computer Interaction* 30, no. 1 (2014): 52.

Fig. 30. *Daniel and Megan in Beat Board of Reconcile,* Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

Fig. 31. *Daniel and Megan in Beat Board of Reconcile,* Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

Fig. 32. *Daniel and Megan in Beat Board of Reconcile,* Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

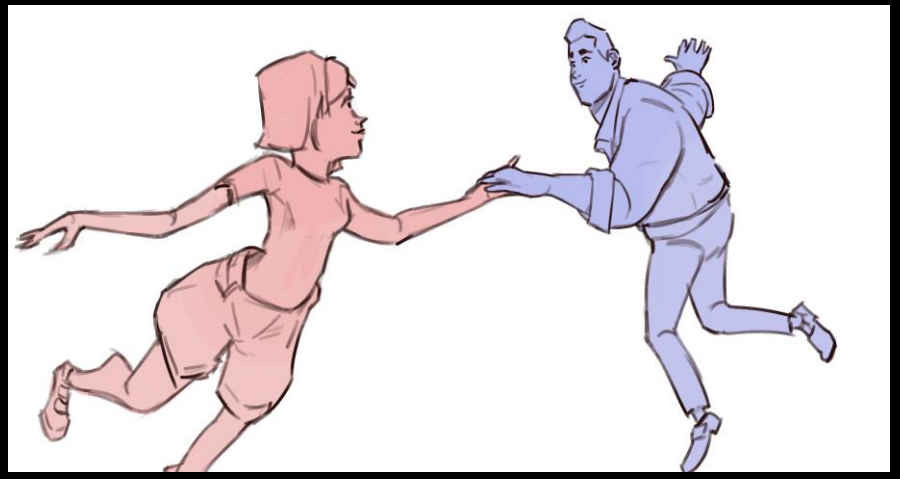


Fig. 33. *Daniel and Megan in Beat Board of Reconcile,* Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

Fig. 34. *Daniel and Megan in Beat Board of Reconcile*, Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

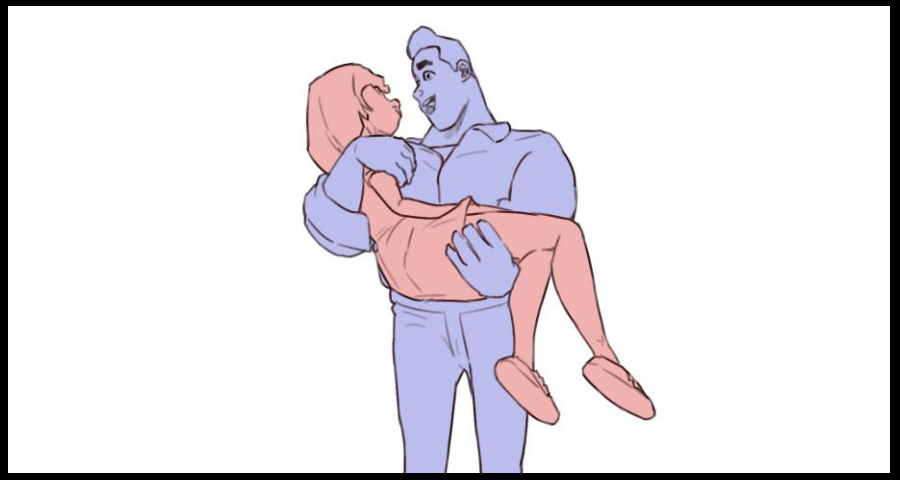


Fig. 35. *Daniel and Megan in Beat Board of Reconcile,* Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

Fig. 36. *Daniel in Beat Board of Reconcile,* Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

Fig. 37. *Daniel in Beat Board of Reconcile*, Xiaotong Liu, 2024, Clip Studio Paint, 2048 x 1083 pt.

Storyboard

The initial storyboard design included three scenes from the TV series and one final living room scene, so it aimed to present the development of the story and its logic as much as possible. The conflicts and contradictions among characters create dramatic tension and drive the development of external plots. At the same time, through the "remote control" special effects operation of children outside the TV, the choices and growth of children are revealed, evoking deep emotional resonance among the audience.

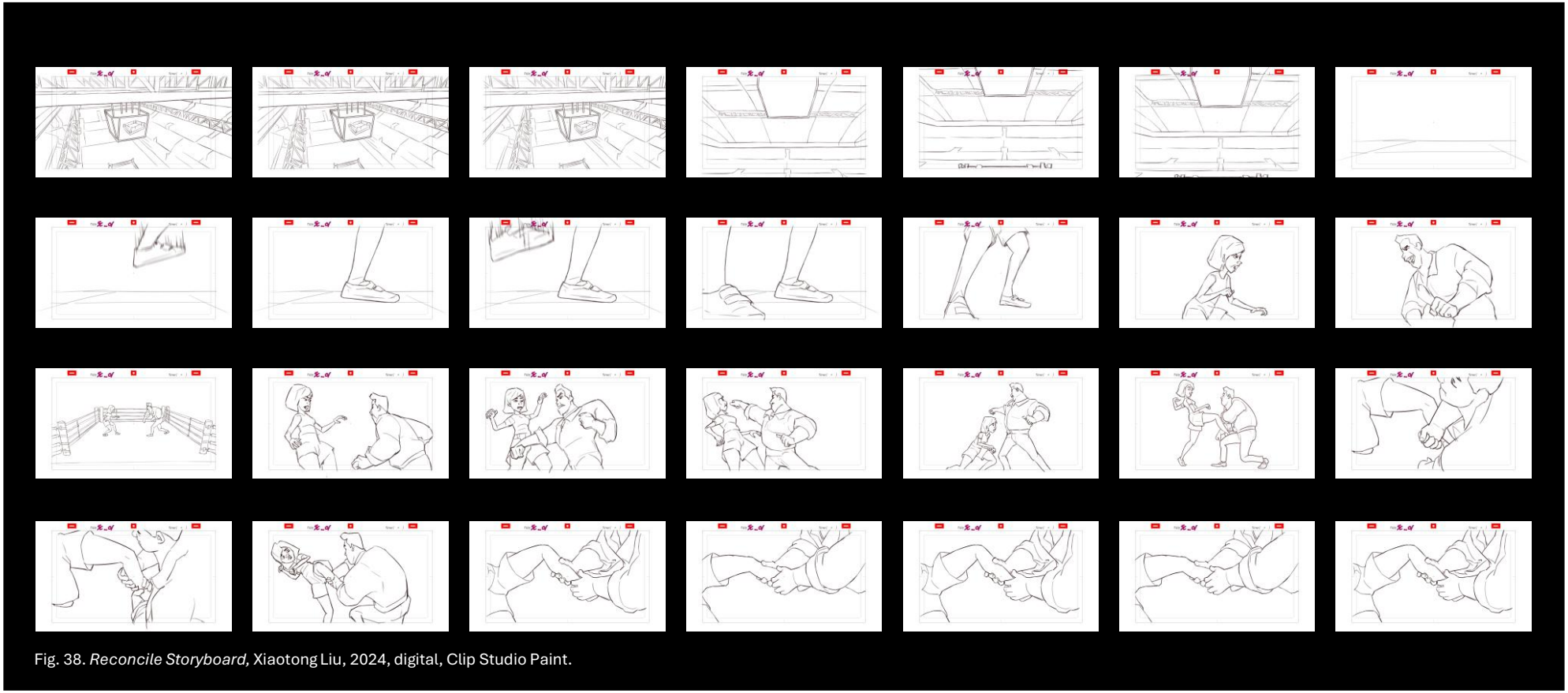


Fig. 38. *Reconcile Storyboard,* Xiaotong Liu, 2024, digital, Clip Studio Paint.

However, when the Storyboard (Fig. 38, 39, 40 and 41) was later compiled into an animatic, it was found that the duration had reached 3 minutes. The addition of many unnecessary plot points actually slowed the pace of the story and the audiences' interest in reading. A certain degree of simplification was made, but the coherence of the content and the consistency of the theme were maintained.

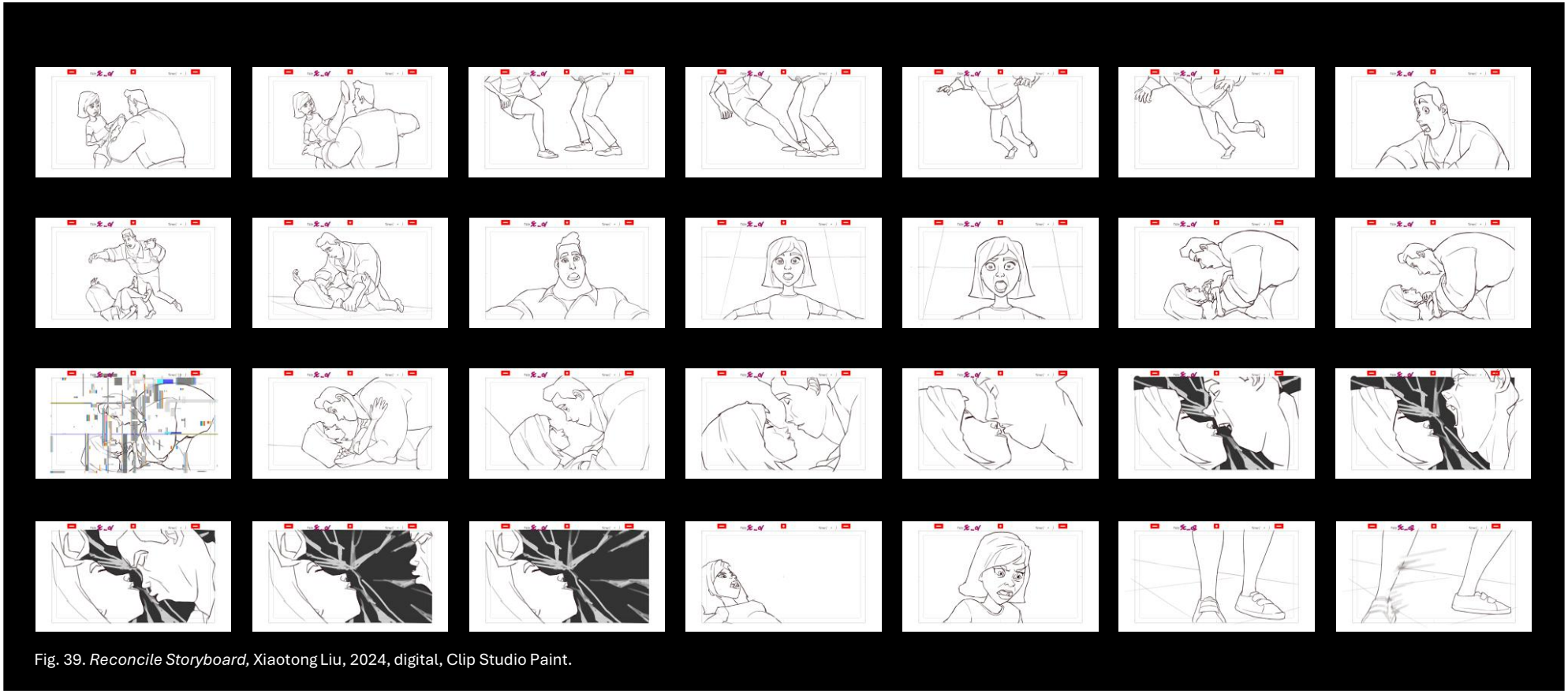


Fig. 39. *Reconcile Storyboard,* Xiaotong Liu, 2024, digital, Clip Studio Paint.

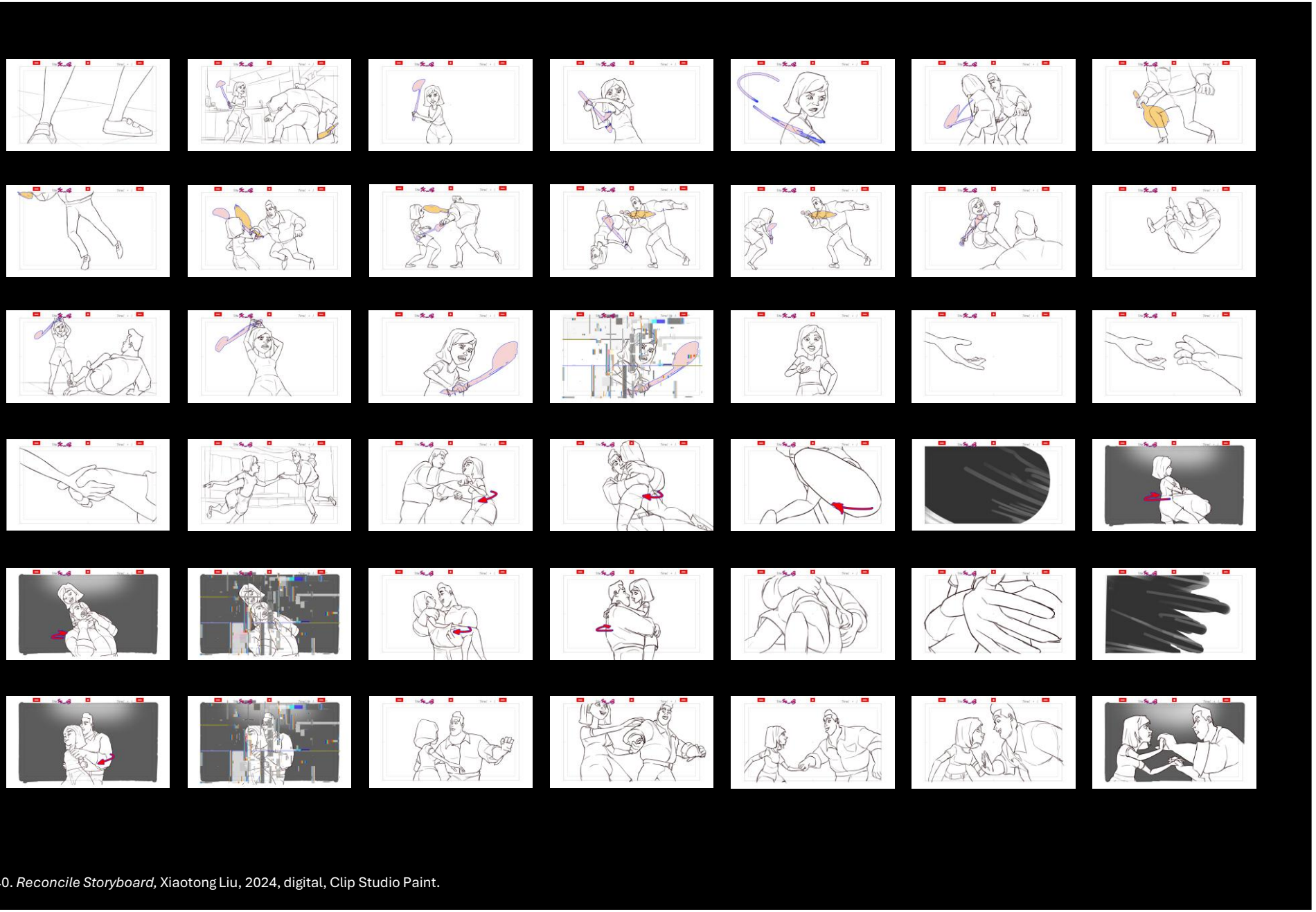


Fig. 40. *Reconcile Storyboard,* Xiaotong Liu, 2024, digital, Clip Studio Paint.

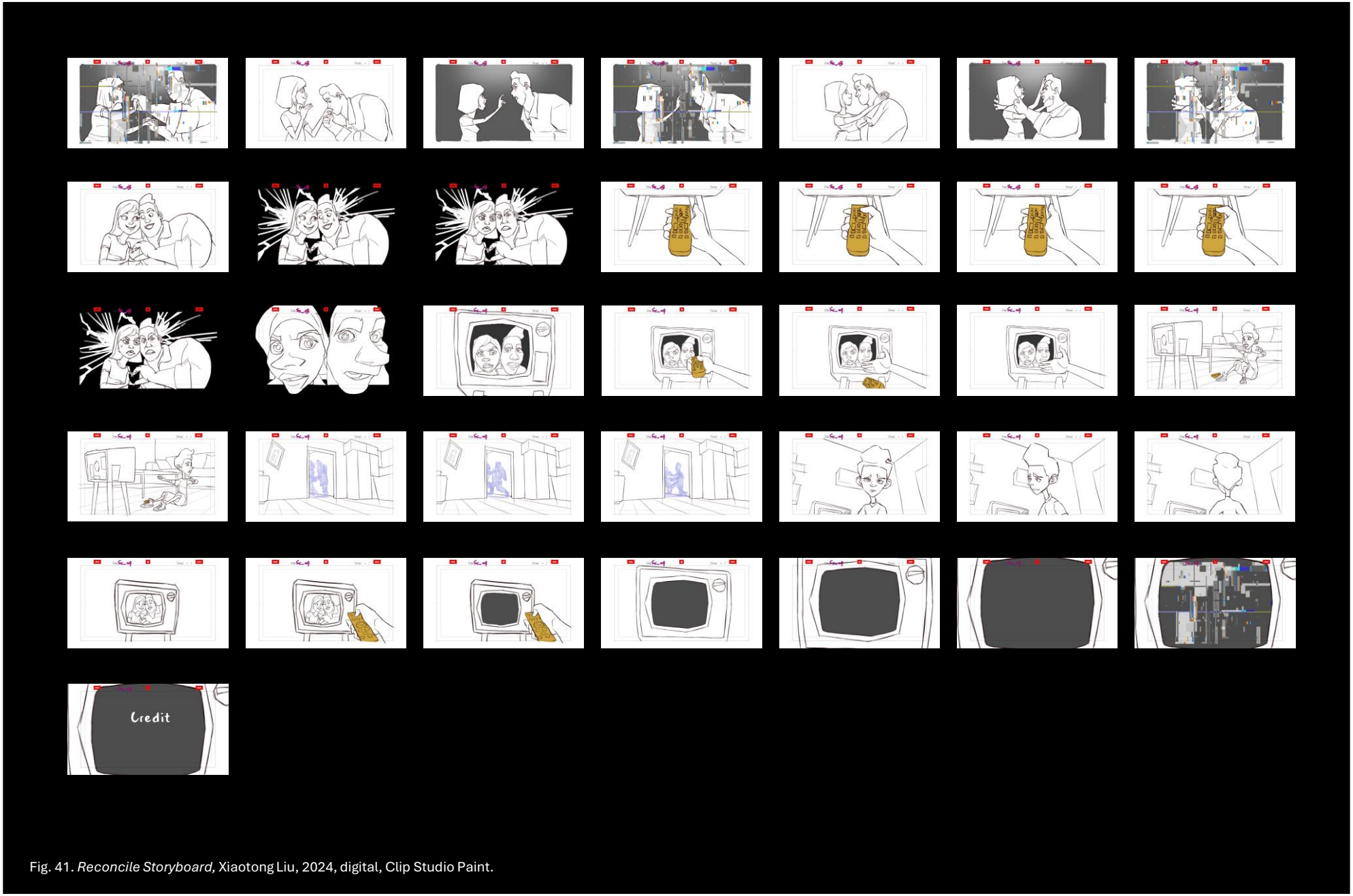


Fig. 41. *Reconcile Storyboard,* Xiaotong Liu, 2024, digital, Clip Studio Paint.


PRODUCTION

Animation

1. Animation Plug-in

The use of animation plugins is to intended to accelerate the animation pipeline. Whenever I come across a new 3D animation character rig, I always use the AnimSchool Picker (Fig. 42) to customize my animation control selection interface. The process of creating pickers involves testing rigs' movement range and limits, as well as gaining a certain understanding of the various variable attributes available to controllers. Building ad picker page is extremely suitable as a warm-up stage for animators. The attributes of these controllers that have been explored will determine the degree of deformation and the degree of key pose realization in the subsequent animation production of my shots.

When the camera and the character are moving simultaneously, if I find that the character's movement arc within the shot does not match the curve in the graph editor, I will use the ArcTracker plug-in[5] made by Spencer Jones to identify the problem in a 3D perspective view. In Scene01_Shot17 (Fig. 43), Megan is changing from a lying-down position to a standing position. The camera will also lag behind and follow the characters as she moves from a low level to a high level. This process involves the superposition of two movements, making it difficult to capture the movement and its rate. I select the nose tip controller to "Create Trail" visualizing its trajectory to observe the movement distance of the nose tip from frame to frame. The rate at the tip of the nose starts from fast and gradually slows until it reaches the peak point on the Y-axis, and then it slows down again and slow out the process.

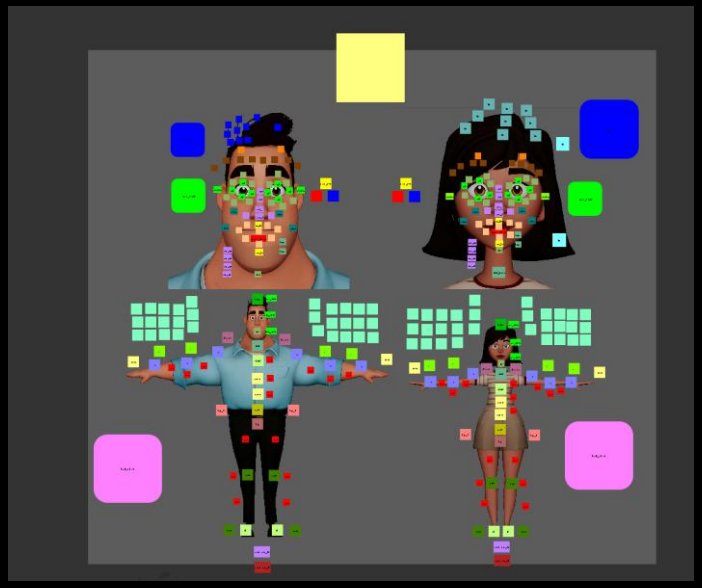


Fig. 42. *AnimSchool Picker*, Xiaotong Liu, 2025, Maya, 1830 x 1505 pt.

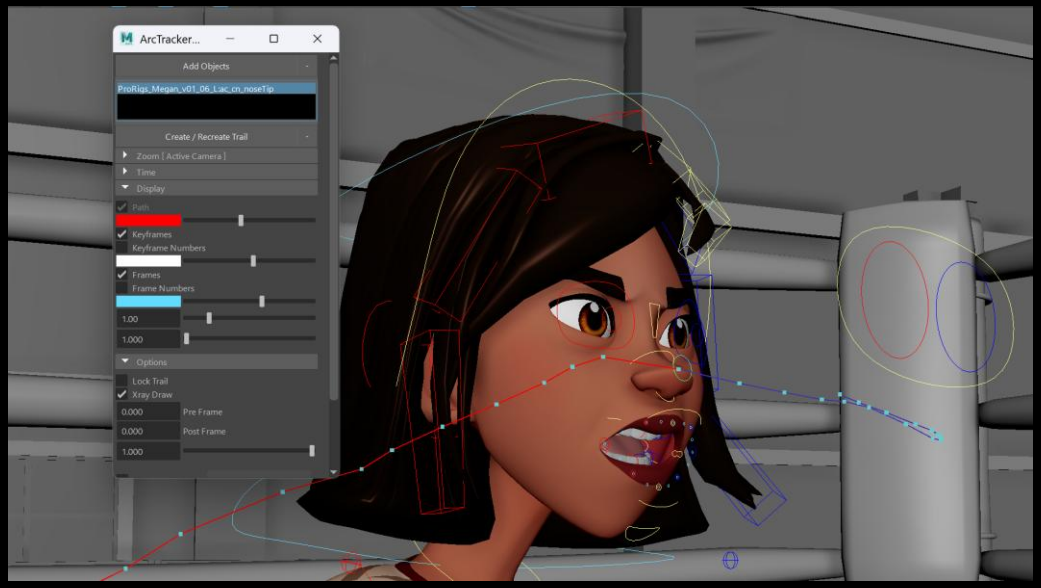


Fig. 43. *ArcTracker*, Xiaotong Liu, 2026, Maya, 1903 x 1066 pt.

5. Spencer Jones, ArcTracker, accessed 2025, https://www.highend3d.com/maya/script/arc-tracker-for-maya

2. Expression Library

Although *Reconcil* is a silent film, the expressions of the characters play a significant role in conveying emotions and moods. Jason Osipa states that the depiction of nuanced emotion and acting is centered almost exclusively on the face and especially the eyes. People naturally focus on the eyes when looking at another person or an animated character, and this happens automatically even without deliberate effort.[6] In order to accurately and vividly depict the joys, sorrows, and emotions of the characters and achieve a smooth and rhythmic transition between different emotions, it is helpful to create a Character Expression Library. When expressing the same emotion, the degree and direction of facial muscle contraction and expansion vary between men and women. This is why the Expression Libraries for men and women need to be created separately. In Figure 45, the different degrees of expressions of male and female characters are presented in the library. The production of each basic emotion's expression takes about 2 hours. After having the basic emotional expressions, new neutral expressions can be created by blending different levels of expressions together using the Studio Library plugin.[7]

If you want to create facial expressions that are different from the typical ones, like mixing "anger" and "fear" in different proportions can create a complex emotion of "combined anger and fear". Additionally, details can be added to expressions using sliders, such as increasing the eyebrow curvature by 10% for "happy" or adding a subtle twitch of the corners of the mouth for “anger“ (Fig. 44).

Fig. 44. *Megan’s Anger in Scene01_Shot03*, Xiaotong Liu, 2025, Maya, 1410 x 1542 pt.

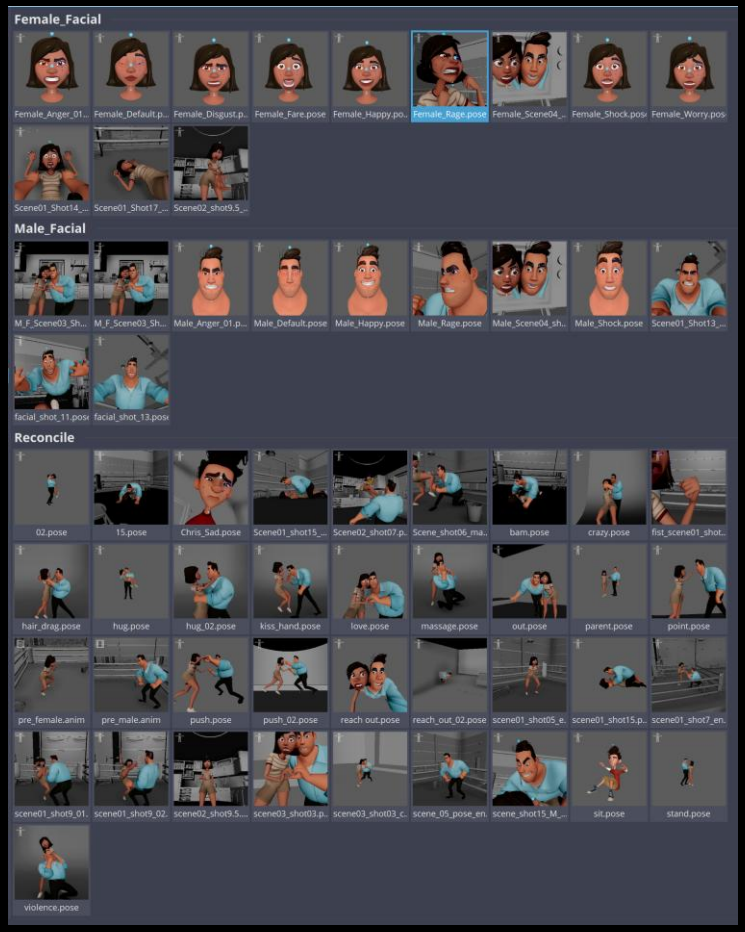


Fig. 45. *Studio Library Expression Library*, Xiaotong Liu, 2026, Maya, 1558 x 1960 pt.

6. Jason Osipa, *Stop Staring: Facial Modeling and Animation done Right*, 2nd ed. (SYBEX 2003; 2007)
7. Kurt Rathjen, Studio Library, accessed 2025, https://www.studiolibrary.com/

3. Camera Position

The concept of “Camera Position” refers to the situation, where in an attempt to achieve a better shape of the character movement in shots, the poor shape shown in the 3D perspective view is overlooked. Therefore, when designing shots with significant perspective distortion or large-scale body deformation of the characters, it is necessary to "deceive" the audience through the camera. In the perspective view of Figure 46, it can be seen that Megan's body spline has become distorted and no longer conforms to the human body structure. At the same time, her arms have also been stretched. However, from the shot in Scene02_Shot09 (Fig. 47), it can be seen that it has achieved the "first-person wide-angle perspective" that I designed in terms of visual language. Eric Luhta emphasized that Wide-angle lenses greatly exaggerate perspective, making them useful for establishing a scene’s spatial arrangement, navigating through the scene, and for situations where the photographer intends perspective to serve as a key compositional element.[8]

Fig. 46. *Scene02_Shot09_Perspective*, Xiaotong Liu, 2026, Maya, 1983 x 1005 pt.

Fig. 47. *Scene02_Shot09_Camera*, Xiaotong Liu, 2026, Maya, 1983 x 1005 pt.

In the boxing scenes and the glitch shots where the relationship suddenly changes (Fig. 48), longer camera lenses are used, with the aim of creating a sense of watching for the audience. This sense of detachment is different from the immersive experience of the story. At the same time, this sense of detachment gives the audience a "child's perspective". This "child's perspective" will be understood at the end of the story when the perspective shifts back to the real world.

Fig. 48. *Scene01_Shot15*, Xiaotong Liu, 2026, Maya, 2088 x 1171 pt.

8. Eric Luhta, Kenny Roy, and Kenny Roy, *How to Cheat in Maya 2012*. 1st ed. Routledge, 2012;2011;2013. “Cameras & Layout.”.

4.1 Character Animation Case - Arcs

I had never realized the power of “Arcs” in the 12 Animation Principles until I produced the *Reconcile* animation. Tony White states that animation, arcs produce movement that is more rhythmic and fluid, thereby lending the animation considerable power and energy.[9] Arcs have a decisive advantage over linear movements in terms of expressing the sense of power, accumulation of force, and release in biological movements. The curved motion means that the object must overcome inertia and change the direction of momentum. In figure 49, I originally intended for Megan to perform the action of holding a ladle and vertically chopping it downward. At this point, only the thrust of the arm was used. However, if the hand first slightly pushed backward to anticipate and then curved downward to swing out, it would utilize the gravitational acceleration. The audience would automatically calculate "this arc needs to rebound", thereby generating a strong sense of "imminent explosion" and centrifugal force. It can also reflect the process where a woman's upper body strength is weak but uses external force effectively. The arc will make the audience feel that the object has weight.

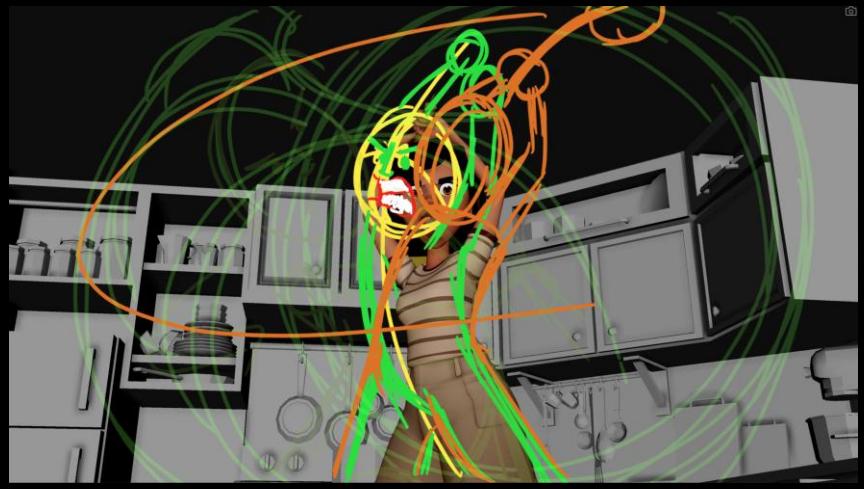


Fig. 49. Scene02_Shot09_Syncketch_Bill Tessier, Xiaotong Liu, 2025, Maya, 2733 x 1533 pt.

Fig. 50. Scene02_Shot07_Syncketch_Bill Tessier, Xiaotong Liu, 2025, Maya, 2728 x 1513 pt.

I also discovered that if different joints of the body could be on the same "Arc", the power of the movement would be enhanced. In figure 50, the arcs of the elbow and the hand are consistent. During Megan's turn, the fk elbow drives the wrist, and the arc movement of the wrist becomes the "follow-through" part. The overlapping arcs also enhance the posture of the character's body, drawing the audience's attention more towards the overall movement of the torso.

9. Tony White, *Tony White's Animator's Notebook*. 1st ed. Taylor & Francis Group, an informa business, 2012;2011. “Arcs and Anticipation.”.

4.2 Character Animation Case - Contrasting Action

Fig. 51. Scene02_Shot06_Syncketch_Bill Tessier, Xiaotong Liu, 2025, Maya, 2746 x 1416 pt.

Fig. 52. *Scene02_Shot06,* Xiaotong Liu, 2025, Maya, 1946 x 973 pt.

Fig. 53. *Scene02_Shot06,* Xiaotong Liu, 2025, Maya, 2726 x 1450 pt.

Contrasting Action refers to the comparison of actions that follow a diagonal trend or an opposite motion trend within several consecutive frames. This strong contrast creates a sense of instantaneous power and weight.

In figure 51, Daniel is in a defensive stance after being hit, with his body positioned in a diagonal line from the lower left of the screen to the upper right. When it was Daniel's turn to attack (as shown in figure 52), his body assumed a diagonal posture from the lower right of the screen to the upper left. The contrast between the left and right diagonals in the preceding several frames added a sense of power and suddenness to Daniel's counterattack.

Fig. 54. *Scene03_Shot01,* Xiaotong Liu, 2025, Maya, 2093 x 1168 pt.

Fig. 55. *Scene03_Shot01,* Xiaotong Liu, 2025, Maya, 2095 x 1172 pt.

However, key poses that are clearly distinct from the previous and subsequent poses is not sufficient. The dynamic gaps in the middle will give the audience a sense of disconnection. The anticipation action shown in figure 53 was added. However, at this point, Daniel's body position had already been extremely close to the diagonal "bottom right top left" posture, while his hands were still in the anticipation stage. This way, it will cause the audience's eyes to first focus on Daniel's body, and then there will be a brief pause before Daniel's hands suddenly cast astonishing strength.

Contrasting action was also applied to the dynamic changes before and after the glitch in Scene 03. In figures 54 and 55, in order to create a significant change in the relationship and emotions between Megan and Daniel before and after the glitch, a clear contrast was made between the two in terms of distance and silhouette. When their relationship was closer, the spatial distance between them was close, and their limbs were folded and close together. After the glitch occurred, their limbs stretched out, and the spatial distance also increased significantly. The silhouettes of the two presented a diagonal trend of confrontation and intersection on the screen.

4.3 Character Animation Case - Cut before Animation Stops

If the ending frame of the animation is set to the exact frame when the glitch occurs, the movement would resemble a deliberate stop or slow-in effect specifically designed to accommodate the glitch, rather than the movement being abruptly halted by the glitch. The ending frame of the animation is usually set 5 frames after the glitch in order to prevent causing the sense of that on purpose. This technique can be seen in many shots of *Reconcile*.

For example, in Scene 01 Shot 15 (Fig. 56), Megan is lying on the ground, struggling. Her root will move back and forth along the x-axis and z-axis, and her arm will rotate in three different directions. This can be verified from figures 57 and 58, where Megan's root translation and the rotation properties of her arms can be observed. By placing the "slow-in" effect on frames that are not affected by the glitch, I not only give the editing enough time but also make the end of the animation look natural.

Fig. 56. *Scene01_Shot015,* Xiaotong Liu, 2025, Maya, 2093 x 1170 pt.

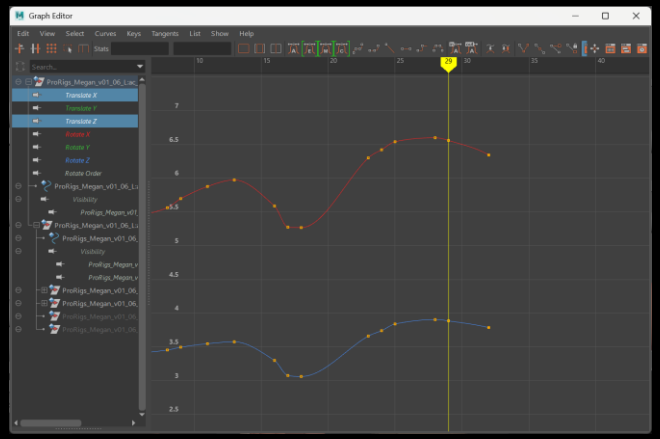


Fig. 57. *Scene01_Shot015_Root_Graph Editor,* Xiaotong Liu, 2025, Maya, 1482 x 986 pt.

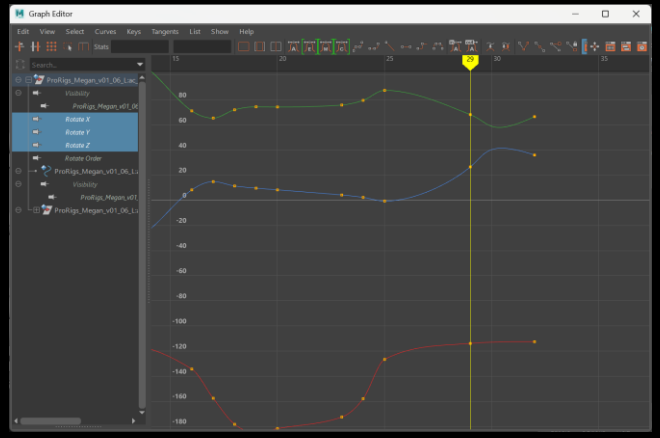


Fig. 58. *Scene01_Shot015_Arm_Graph Editor,* Xiaotong Liu, 2025, Maya, 1482 x 986 pt.

This technique has been verified in many of the *Reconcile* scenes. Another example is the swinging and chopping action of Megan in scene 02 shot 09, as shown in figure 59. The translation of the ladle and the rotation of the torso both extend a few frames backward at the moment when the glitch occurs (figure 60 and 61). But in fact, not only should the frames with glitches have a longer buffering time, but many shots with cut-on actions should also follow this rule. This is also a valuable insight that I gained from making this film.

Fig. 59. *Scene02_Shot09,* Xiaotong Liu, 2025, Maya, 2088 x 1176 pt.

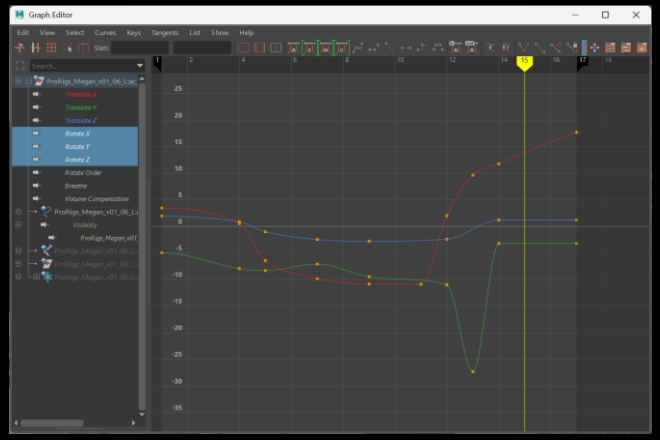


Fig. 60. *Scene02_Shot09_Ladle_Graph Editor,* Xiaotong Liu, 2025, Maya, 1482 x 986 pt.

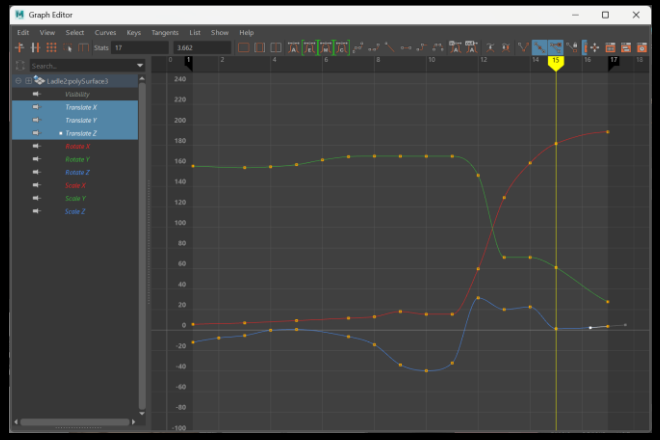


Fig. 61. *Scene02_Shot09_Torso_Graph Editor,* Xiaotong Liu, 2025, Maya, 1482 x 986 pt.

Animation Reference

Fig. 62. *Scene02_Shot04_Live Action,* Xiaotong Liu, 2025, digital, 1524 x 854 pt.

Fig. 63. *Scene02_Shot04_Live Action,* Xiaotong Liu, 2025, digital, 1523 x 847 pt.

Fig. 64. *Scene02_Shot04,* Xiaotong Liu, 2025, Maya, 2088 x 1172 pt.

In order to better follow the production process of the animatic design for the scene featuring Daniel and Megan's dueling (Fig. 64), I invited a friend (Fig. 62) to assist me in recording a series of live-action scenes as my animation reference. In terms of the selection of actor, I chose an actor whose body type was suitable for a strong male. This is because the size of the character also affects the force of the movements and the slow-in and slow- out of the actions. Derek Hayes believes that for an animator who works with a variety of characters, the most immediate and obvious step in understanding these animated personalities is to become acquainted with their external, physical attributes.[10] However, correspondingly, as actors are not animators, their performances might be realistic rather than cartoonish. I also played the role of the muscular Daniel myself (Fig. 63) to simulate the rhythm and silhouette that matched the style of motion I desired.

10. Derek Hayes, and Chris Webster. *Acting and Performance for Animation*. 1st ed. Focal Press, Taylor & Francis Group 2013.

Fig. 65. *Scene01_Shot017_Live Action,* Xiaotong Liu, 2025, digital, 1733 x 974 pt.

Fig. 66. *Scene01_Shot017_Live Action,* Xiaotong Liu, 2025, digital, 1732 x 8978 pt.

Live action reference may not conform to the rules of animation in common sense, but it is the one that best reflects real life and the psychological and emotional reactions of the characters at present. In shot 17 of scene 01 (Fig. 67), Megan rises from an astonished lying position to an angry upright posture. In the live-action reference I recorded (Fig. 65 and 66), I noticed that when the character's head reached the highest point in the space (the y-axis of Maya), it was not a decelerating movement like a ball bouncing in middle air. On the contrary, because the weight of the upper body that is lifted up causes a release of force at the highest point of the head, there will be an acceleration movement of the head at that point.

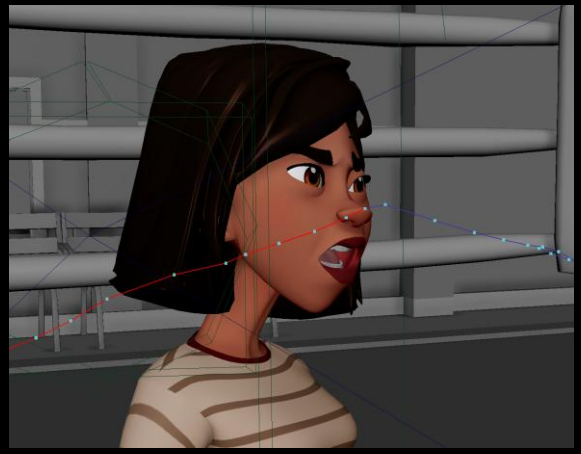


Fig. 67. *Scene01_Shot017,* Xiaotong Liu, 2025, Maya, 1421 x 1115 pt.

Fig. 68. *Scene02_Shot08,* Xiaotong Liu, 2025, Maya, 2095 x 1176 pt.

Fig. 69. *Scene02_Shot08_Live Action,* Xiaotong Liu, 2025, digital, 1587 x 884 pt.

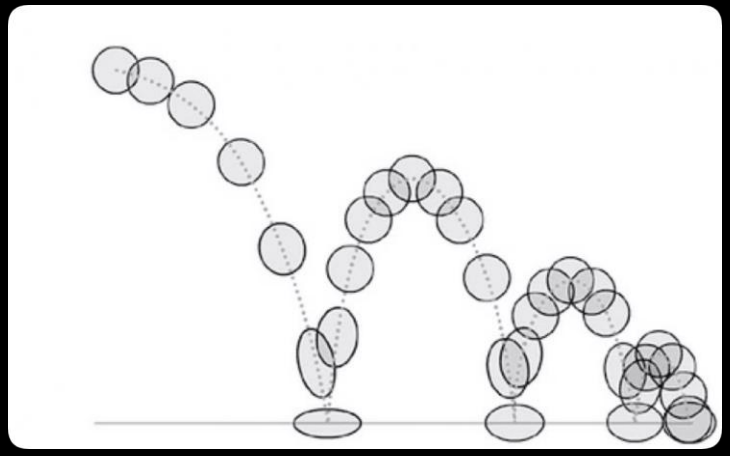


Fig. 70. Bouncing Ball, 2025, digital, (Pinterest, https://www.pinterest.com/pin/774124928034638/).

Live action reference refers to realistic movement. It should serve as a dynamic reference and should not be directly copied. In shot 8 of the scene 02 (Fig. 68) where Daniel was knocked to the ground by Megan, if the animation was done according to the reference (Fig. 69), at the moment when Daniel's bottom touches the ground, his center of gravity is almost fixed on the ground. Although it can convey the sense of weight of the characters, it lacks the "elasticity" of animation. Therefore, the bounce back animation after the character touches the ground should be added in the same way as for the heavier balls (Fig. 70), and the character should land again and then slightly bounce up before landing again.


POST-PRODUCTION

Lighting

1. Spawnable Actor - Light

My workflow used Unreal Engine for rendering, which significantly reduced the time I spent on the final rendering. Instead, more time was spent on the lighting of each shot and the design of the individual sequences and the mastertrack. Because all the shots within a scene need to be placed onto a sequence within the scene content, and the main light source of the scene is determined to be uniform. When adding lights for a specific shot, I create the lights in the scene and then add them to the sequence of that specific shot. At this moment, the lighting not only illuminates the specific characters in the shot but also interferes with the effect of the main light in the scene, as well as affects the lighting effects of other shots.

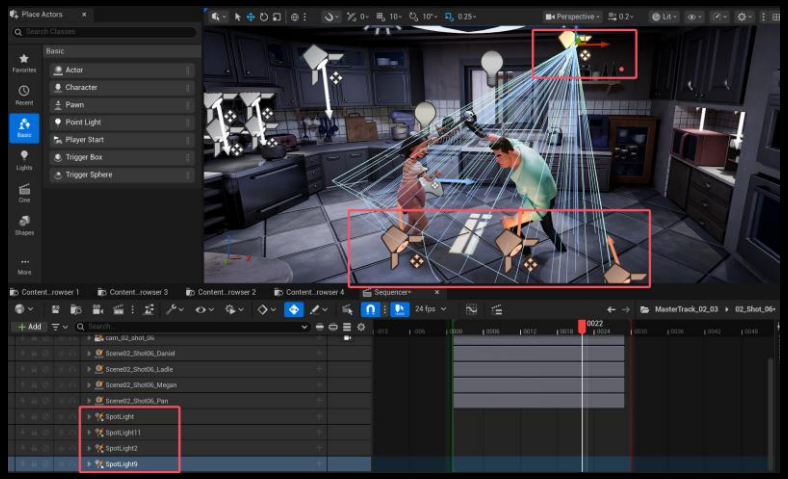


Fig. 71. *Scene02_Shot06_Perspective,* Xiaotong Liu, 2026, Unreal, 2127 x 1286 pt.

Fig. 72. *Scene02_Environment_Lighting,* Xiaotong Liu, 2026, Unreal, 1607 x 853 pt.

The lighting design for each shot is achieved by adding spawnable lights within each shot's sequence (shown in Fig. 71), based on the main lights of the 3D scene outside the sequence (Fig. 72). The lights that are added to the sequence should be changed to "Spawnable Actor". At this time, the lights will only be effective in this specific shot's sequence and will not affect the main scene or the sequences of other shots. This method is also applied to the displacement and rotation of specific scene objects when setting up the context of each shot.

2. Individual Shot_Light

Fig. 73. *Scene02_Shot09,* Xiaotong Liu, 2026, Unreal, 1293 x 724 pt.

Fig. 74. *Scene02_Shot09_Lighting,* Xiaotong Liu, 2026, Unreal, 1558 x 723 pt.

Jeremy Birn points out that while engrossed in the narrative and following the characters' experiences, most viewers will never consciously notice the lighting in a film; instead, they will instinctively respond to it.[11] Good lighting assists in understanding the content of the shot, rather than adding unnecessary details. For the lighting of a single shot, in addition to adding a sky dome with HDRI (rim light), many auxiliary lights will also be added. At the same time, there will also be the "Sky Light" color scene feature, which adds color-tinted reflections to the dark areas of the environment. In scene02_shot09 (Fig. 73), I added a top-point light_05 (for hair structure display) for Megan, spot lights_02_04 (key light) on the right side of her face and on the ground tiles for reflection (outline the three-dimensional features of the face), as well as a warm-toned ambient light spot light_01 and a point light_03 (fill light) to increase the detailed colors in the shadow areas. All information can be seen in figure 74.

After the auxiliary lighting has been applied, Post Process Volume will be set up in the scene to comprehensively modify the exposure, color saturation and color bias of the environment (Color Grading). During the final sequence rendering stage, I discovered that when exporting the master track, motion blur would be automatically included. I could also select the "Amount" and "Max" attributes of "motion blur" in the post process properties and set their values to 0 to disable motion blur.

11. Jeremy Birn, *Digital Lighting & Rendering*. 2nd ed. New Riders 2006.

Compositing

1. Sequence_MasterTrack

The first time I discovered that when using the Alembic system to export animations from Maya and import them to the Sequencer in Unreal Engine, the animation data of the last frame would disappear (Fig. 75), regardless of whether I extended the end frame of that sequence or expanded the display range of the animation. The last frame of the animation will always return to the position of the first frame. This kind of situation usually occurs when the animation assets have been fully played out. Whether I turn on "Keep State When Finished" in the properties of the animation assets or add extra frames in the "End Frame Offset" attribute (Fig. 77), the animation will still return to the posture of the first frame.

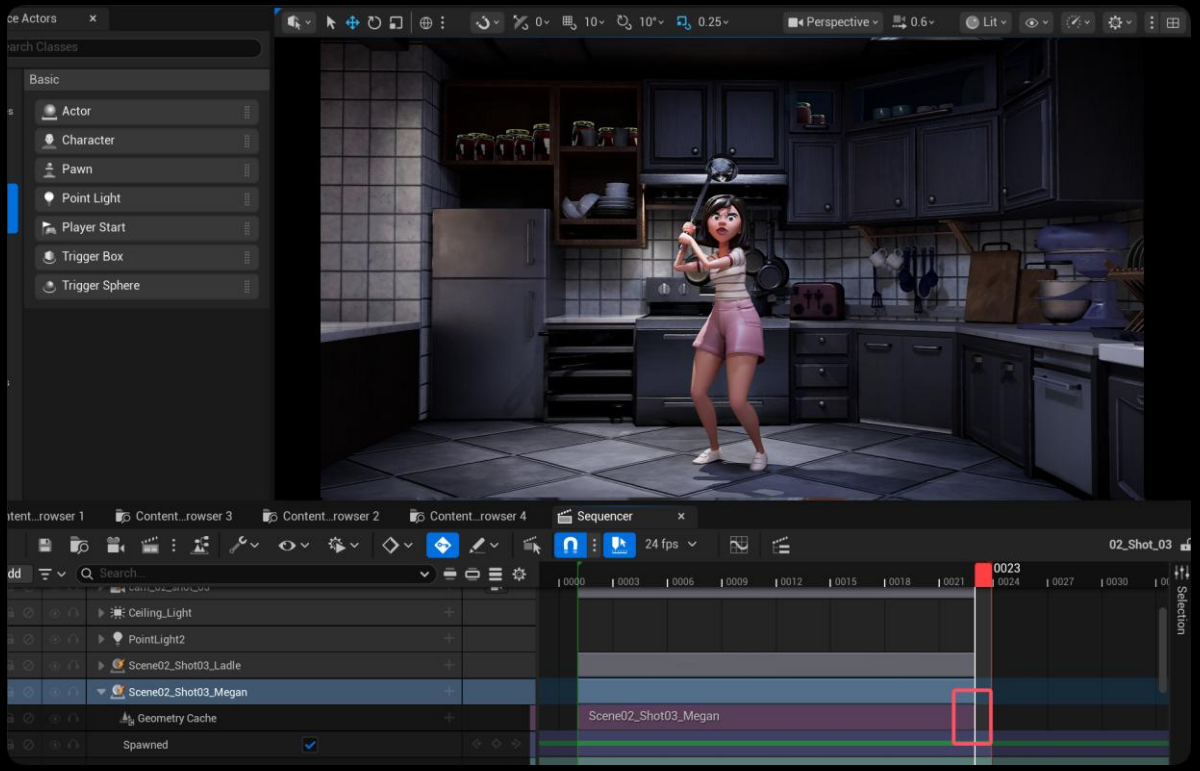


Fig. 75. *Scene02_Shot03_Sequence*, Xiaotong Liu, 2026, Unreal, 1956 x 1255 pt.

Compositing

Fig. 76. *Screenshot of Alembic Import*, Xiaotong Liu, 2026, Unreal, 759 x 232 pt.

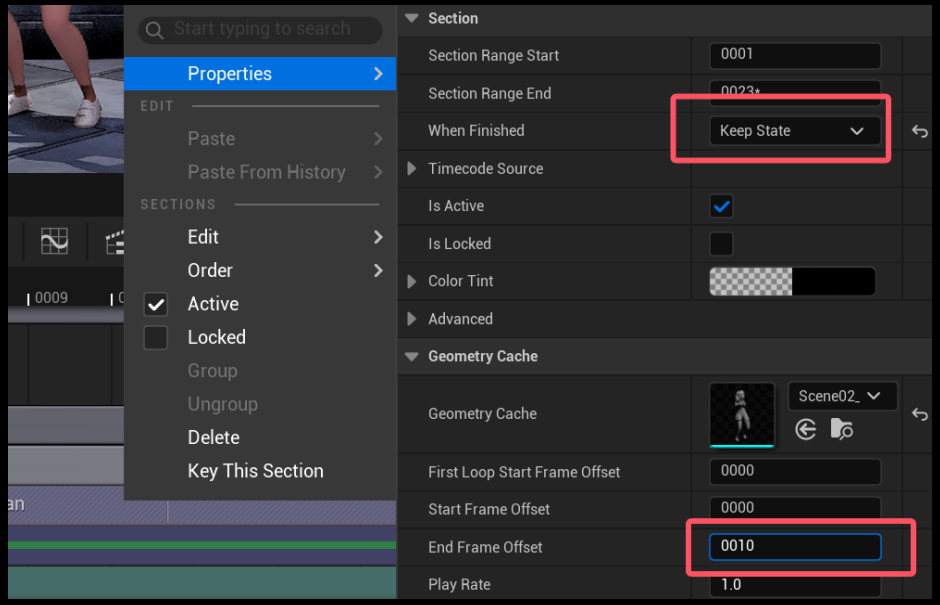


Fig. 77. *Screenshot of Alembic Import*, Xiaotong Liu, 2026, Unreal, 998 x 640 pt.

Based on the results of multiple attempts, the conclusion drawn is that when importing Alembic animation, increase the "End Frame" value by one frame (Fig. 76). At the same time, ensure that the length of the animation layer in the sequence is consistent with the actual length of the Alembic animation. Unreal will automatically treat the extra frame as the last frame, while retaining the animation content of the second-to-last frame and make animation sequence “When Finished” attribute “Keep State” (Fig. 77).

2. Credit List

Fig. 78. Credit List in *Premiere Pro*, Xiaotong Liu, 2026, Premiere Pro, 3098 x 1958 pt.

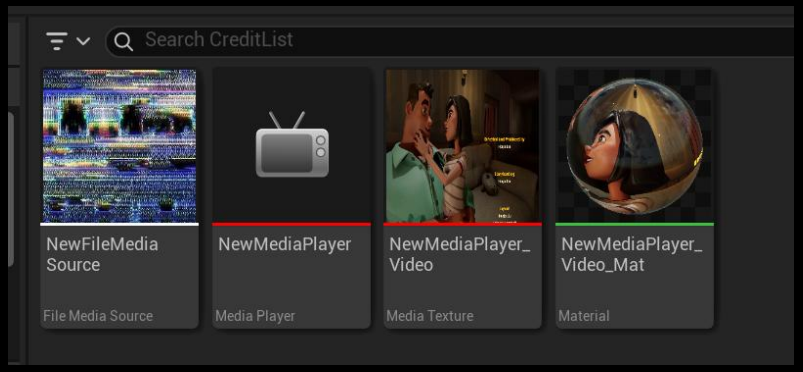


Fig. 79. *Screenshot of Media Texture Content*, Xiaotong Liu, 2026, Unreal, 804 x 366 pt.

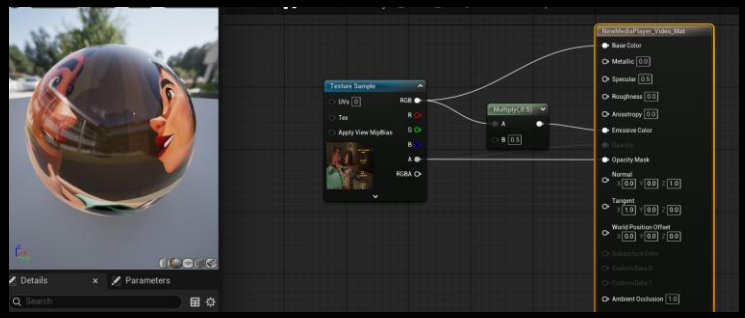


Fig. 80. *Screenshot of Media Texture Editor*, Xiaotong Liu, 2026, Unreal, 1691 x 705 pt.

Fig. 81. *Screenshot of Credit List in Unreal*, Xiaotong Liu, 2026, Unreal, 1496 x 816 pt.

The ending of *Reconcile* adopts a long shot approach, accompanied by the sound of parents' arguments and the black screen of the TV screen. Therefore, the Credit List was design to maintain the consistency of the shot and not be achieved through a cut. Thanks to the final focus on the TV in Scene 04_Shot 05, I was able to use an extremely ingenious ending method. First, I edited the credit list's images and text in Premiere (Fig. 78). Then, I used the Video Material function in Unreal (Fig. 79 and 80) to convert the edited video into a material and apply it to the screen inside the TV. This made the Credit List appear to scroll by on the television screen (Fig. 81).


CONCLUSION

Conclusion

Fig. 82. *Scene02_Shot08*, Xiaotong Liu, 2026, Unreal, 1798 x 1018 pt.

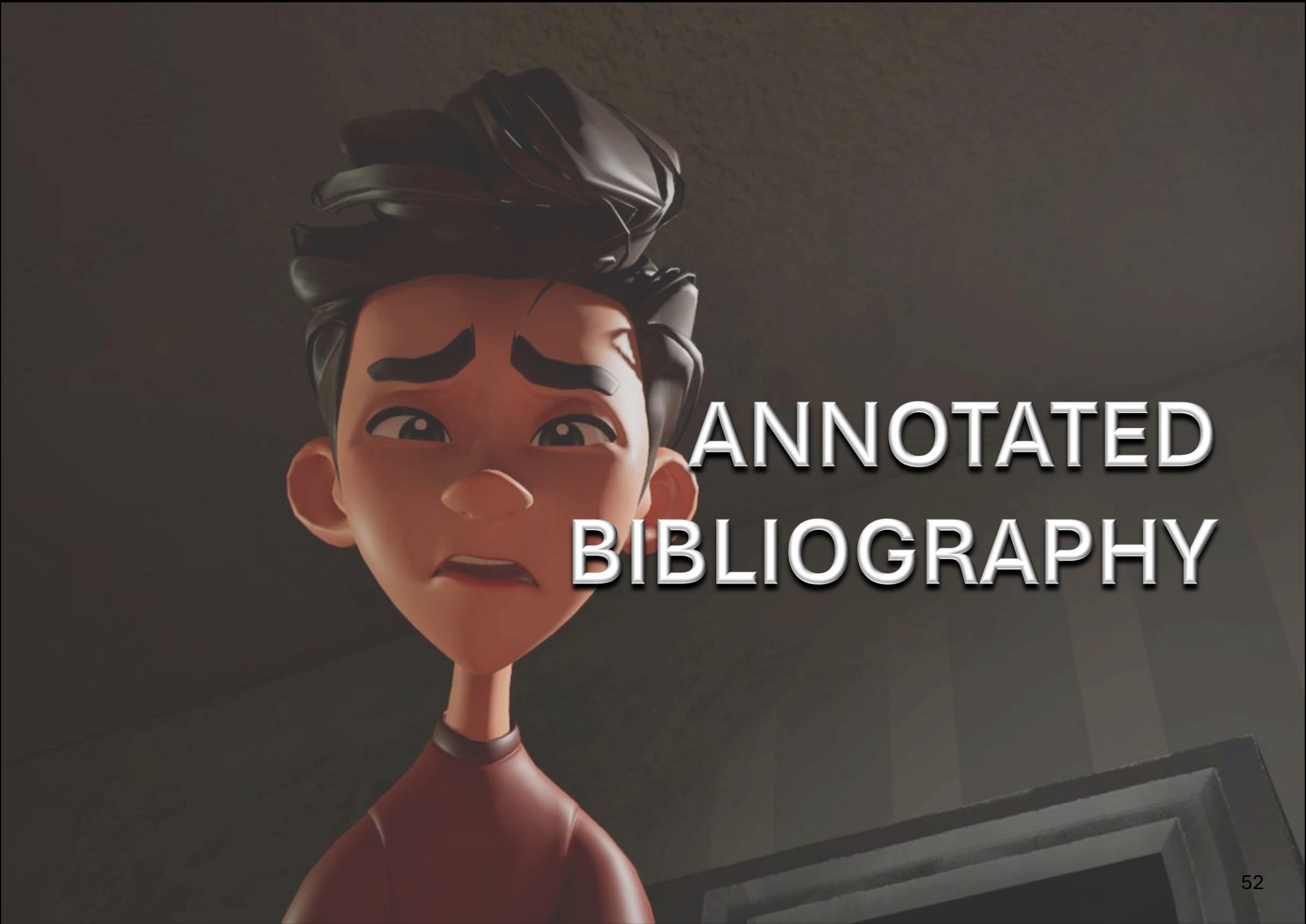
1. Challenging myself is a form of growth

For the first time, instead of designing the film based on the animation techniques and workflow that I already had, I focused more on describing the story content emphasizing the desire to use animation to achieve the mapping of real life and the inspiration of the audience, rather than merely showcasing technical skills. This does pose certain challenges for one's ability as a director and screenwriter, because just making the animation good doesn't mean the story is well told. At the same time, through this process of going from nothing to something, I mastered the pipeline that combines traditional 3D animation workflow with game engine tools. Attempts were also made in character binding and fabric production of clothes. Although the results were not satisfactory, they did lead to a deeper understanding and the establishment of more theoretical cognition of characters' skeleton hierarchy.

2. Always keep taking action

Don't worry about the good or bad aspects of the process. Either you learn something or you succeed. Many things may seem challenging, but in fact they are not as difficult as imagined. The hardest part is just taking the first few steps. I still remember the action depicted in Figure 82 where the character is kicked into the air. I always struggled to find good live-action references or to record it myself. Finally, I treated this shot just like a 2D animation, and carried out the keyframe drawing and timing adjustment and arranged the rebound animation after the landing of the "Daniel" character as if he was a weighted ball.

The process of making *Reconcile* brought me many gains and also many regrets. However, these regrets will not dampen my courage in the future when I pursue my career in the animation industry. These challenges will serve as my future goals and the direction of my efforts, and I will strive to solve them one day in the future. Being afraid of losing makes me nervous, but the desire to win doesn't. Finally, I would like to express my gratitude to my parents who have always supported me in completing my studies, and to the committee members who have continuously helped me.


ANNOTATED
BIBLIOGRAPHY

Annotated Bibliography

Birn, Jeremy. *Digital Lighting & Rendering*. 2nd ed. New Riders 2006.

Jeremy‘s theory about lighting provided me with a theoretical basis for understanding the complexity and diversity of lighting during the lighting process. The main function of lighting is to make the objects within the shot more readable and believable. At the same time, the lighting for different shots should maintain the continuity of the story. We should avoid making the lighting the main focus that attracts the audience in shots. Lighting can guide the viewer's line of sight. It can make the foreground dark, the main subject in the middle bright, and the background less bright. This creates a "bright - dark - bright" rhythm, and the viewer's gaze will be fixed on the bright area in the middle.

Boss Baby. Directed by Tom McGrath. DreamWorks Animation, 2017. https://www.netflix.com/watch/81037060.

The contrasting animation styles of Tim's exaggerated, emotive expressions and Templeton's controlled, calculated performances in *Boss Baby* masterfully visualize the core conflict between childish innocence and adult sophistication. This duality not only defines their characters and comedic dynamic but also serves as an exemplary study for animators in how choices, from timing to exaggeration, are fundamentally driven by a character's internal logic.

Buisine, Stéphanie, Matthieu Courgeon, Aurélien Charles, et al. "The Role of Body Postures in the Recognition of Emotions in Contextually Rich Scenarios." *International Journal of Human-Computer Interaction* 30, no. 1 (2014): 52-62.

Stéphanie Buisine, as a senior researcher in the field of human-computer interaction and affective computing in France, her research on body posture and emotion recognition has high practical value. This journal provides evidence of my approach in the early stages of animation, using the storyboard method to explore the emotions conveyed by body postures in specific scenarios, as well as the matching degree of the combination of body language and expressions. Proper expression of emotional posture can convey the liveliness of the animated characters, rather than causing more confusion for the audiences.

Chris from Downloads, 2024, Prorigs, https://prorigs.com/account/downloads/family-rigs/.

This is the rig that I used in the *Reconcile* animation, which represents the child character from external - real world outside the TV screen. In order to maintain the consistency of the character style, the rig used is also in a cartoon style. The professional and feature-rich animation controls have greatly facilitated my animation workflow and visual presentation effect.

Daniel and Megan from Downloads, 2024, ProRigs, https://prorigs.com/account/downloads/family-rigs/.

These are the rigs that I purchased and obtained the usage rights for, which I used to portray the image of *Reconcile*'s parents. They have a strong visual impact and shape contrast in terms of gender and body type. The professional and feature-rich animation controls have greatly facilitated my animation workflow and visual presentation effect.

Eric Luhta, Kenny Roy, and Kenny Roy. *How to Cheat in Maya 2012*. 1st ed. Routledge, 2012;2011;2013. "Cameras & Layout.".

As the official Maya training program instructor of AnimationMentor, Luhta's practical work experience and methods have been verified by numerous animation projects. His book has been of some help to me in understanding the settings of the Maya camera. How to position the camera in a 3D scene to make the movement of the characters more dynamic and what kind of shot size and focal length to choose to highlight the visual language within the shot. At the same time, I also understand that only through repeated experimentation and trial can the best solution for the camera settings be found.

Hayes, Derek, and Chris Webster. *Acting and Performance for Animation*. 1st ed. Focal Press, Taylor & Francis Group 2013.

Animators need to pay attention to the personality and physical characteristics of the animated characters and think about how these characters reflect real-life figures beyond the animation script. When referring to the animation, one should understand the character's mental state based on the specific events and the scenes that occur. People with different personalities and genders have different body language. At the same time, do not deliberately create typical character actions in an artificial way to express a certain emotion.

Heiss, Jerold S. "Degree of Intimacy and Male-Female Interaction." *Sociometry* 25, no. 2 (1962): 197-208.

This article, written by Jerold as a host and TV personality, discusses the differences in the status and functions of men and women in social relationships, as well as the relationship between intimate relationships and interactions between men and women. These background materials and theories provided theoretical support for my research on the status of parent-child relationships in families and the behavioral decisions made by both men and women in intimate relationships.

Hopcroft, Rosemary L. "Gender Inequality in Interaction — an Evolutionary Account." *Social Forces* 87, no. 4 (2009): 1845-1871.

Professor Hopcroft's research is renowned for her distinctive interdisciplinary nature. She is dedicated to bridging the gap between sociology and life sciences. The article explores the reasons for gender inequality by analyzing the social status and access to resources of men and women. These factors have influenced the work and family preferences of men and women. It also explains that women tend to invest more energy and resources in raising children, thereby supporting the contradiction between women's strong desire to express themselves in the family domain and men’s dominance. These gender studies in sociology have laid the social theoretical foundation for the gender conflicts in the *Reconcile* story.

Hurbis-Cherrier, Mick, Mick Hurbis-Cherrier, Gustavo Mercado, and Gustavo Mercado. *Voice & Vision*. 4th ed. Vol. 1. Routledge, 2025. "The Art and Technique of Editing.".

Mick Hurbis-Cherrier is the author of the classic book on film production, "Voice & Vision". What he tells in the book is that the essence of editing is to enable the shots of script to be combined into a complete film, rather than strictly following the content of the initial storyboard or the script. Make full use of the existing materials and music for creation. Learn to use various cutting techniques, such as dissolve, L-Cut and J-Cut, etc. The industry-related experience discussed in this book provided me with inspiration for the simplification process of my initial animatic.

Kirkorian, Heather L., Tiffany A. Pempek, Lauren A. Murphy, Marie E. Schmidt, and Daniel R. Anderson. "The Impact of Background Television on Parent-Child Interaction." *Child Development* 80, no. 5 (2009): 1350-1359.

Dr. Kirkorian's academic authority is rooted in her pioneering and continuous research in the interdisciplinary field of "children, media and families". The materials presented in this article and the related experiments have provided supporting evidence that during the cognitive and physical growth stages of children, the family environment and the social interactions between children and their parents are significant factors influencing personal development. As *Reconcile*, which tells the story from a child's perspective, Kirkorian, Heather L.'s theory indeed supports the feasibility of my film presenting the story from a child's perspective.

Kumar, Abhishek. *VR Integrated Heritage Recreation*. Apress L. P, 2020. "Material Setup in Unreal Engine 4.".

Learn how to correctly connect the texture maps exported from Substance Painter to the materials created in Unreal Engine. How to add nodes and convert them into parameters. Create instances for the "materials" and make them controlled by the "parent material". Abhishek's authority mainly stems from his extensive practical experience in the industry, and his book plays a foundational role in establishing the workflow for "how to correctly link materials from the substance painter to Unreal".

Kurt Rathjen, Studio Library, accessed 2025, https://www.studiolibrary.com/.

The efficient Maya tools that accelerate workflow and help animators to create mixed facial expression and body animation. It can also save the golden pose, as well as mirror animations. The different degrees of expressions of male and female characters are easily captured in my *Reconcile* pose library.

LadyBug CatNoir. Directed by Jeremy Zag. Miraculous Corp, 2023. https://www.netflix.com/watch/81383247.

The film demonstrates how to gradually bring two people closer through music, lighting, and dance combat. The process involves moving from tension and opposition to increasing trust and emotional connection.

Nimona. Directed by Nick Bruno and Troy Quane. Annapurna Pictures, DNEG Animation, 2023. https://www.netflix.com/watch/81444554.

This film gives me inspiration on how to use visual language to depict emotional conflicts. The confrontations can be framed through composition, deep focus, and color contrasts to emphasize distance and conflict, while their intimate standoffs blend cooperative familiarity with hostile intent. Lighting shifts from cold to warm tones and through shared light, visualizing characters' emotional connection.

Osipa, Jason. *Stop Staring: Facial Modeling and Animation done Right*. 2nd ed. SYBEX 2003;2007.

Jason proposed a highly effective facial animation system and methodology. The core of this approach lies in its unique "poses" workflow, which breaks down complex facial expressions into combinations of facial components such as eyes, eyebrows, and mouth, allowing artists to directly control and create more natural animations. It was of great help in assisting me in creating characters that could truly resonate with others by helping me to understand the relationships between facial features and how changes in these relationships will affect expressions.

Sito, Tom and Harold Whitaker. *Timing for Animation*. CRC Press LLC, 2013. "Timing for Animation.".

When depicting heavy objects in animation, more time needs to be given for them to start or stop. Heavy objects have greater inertia and kinetic energy. When creating the animation of Daniel's fall, this book inspired me. It made me realize that I needed to give the character more time to bounce back, because he was falling on a surface with greater friction.

Spellbound. Directed by Vicky Jenson. Skydance Animation, 2024. Animation World Network, https://www.awn.com/sites/default/files/styles/original/public/image/attached/1077967-nextonnetflixanimation20240416-1280.jpg?itok=S25nX7Ia

It guided and inspired me on how to subtly depict the changes and characteristics of the parent-child relationship through the child's perspective, as well as how the behavioral choices from the child's viewpoint could make impact on the relationship between parents. Children tend to subconsciously attribute their parents' conflicts to themselves, believing that doing something "better" will solve the problem. Therefore, the child in *Reconcile* try to change the parents' state by using the remote control.

Spencer Jones, ArcTracker, accessed 2025, https://www.highend3d.com/maya/script/arc-tracker-for-maya.

A very practical tool helps me adjust the movement curves in graph editor and trajectories of the characters' body parts in 3D space. The visualized 3D motion trajectory also helped me change the timing of the animation.

Turning Red. Directed by Domee Shi. Pixar Animation Studios, 2022. Pinterest, https://i.pinimg.com/1200x/44/47/b7/4447b792e70c19ece19fd8943b339353.jpg.

The animated film, *Turning Red* has served as a valuable inspiration for the theme, content, and age coverage of *Reconcile*. The intergenerational issues between parents and children are indeed an important topic in current social relations.

White, Tony. *Tony White's Animator's Notebook*. 1st ed. Taylor & Francis Group, an informa business, 2012;2011. "Arcs and Anticipation.".

Tony White is a highly authoritative "practical authority" in the field of animation. He has accumulated multiple identities such as a senior industry expert, a best-selling author, and an educator. His authority stems not only from his outstanding professional achievements but also from his systematic and theoretical organization of his lifelong knowledge, and his influence on several generations of animators through his writings and education. His book let me once again recognize the significance of Arcs in the Twelve Principle of Animation. Even for simple actions, animators should strive to depict the trajectory of the arc-shaped movement, rather than simply using the straight-line motion generated by computer software to complete the polishing of the animation for the sake of convenience. The arc-shaped movement will also add more rich visual elements to human body movements.

Williams, Richard. *The Animator's Survival Kit*. Faber & Faber Ltd 2021.

Richard Williams, as a pioneer of the animation industry standards, his *The Animator's Survival Kit*, which is regarded as the "bible" for animators, was re-read in parts during the production of *Reconcile*. The part about overlapping movements deepened my understanding of the different movements of different parts of the body at different times. Different parts of a character's body do not start moving at the same time. This book also made me revalue the invisible anticipation actions involved in the process of creating animation references.

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