Meaning in motion:
A kinesemiotic approach to videogame analysis in *Street Fighter V*

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ABSTRACT

Videogames are a semiotically rich medium, capable of utilizing virtually all modes of human expression (Ensslin 2012; Hawreliak 2018). Furthermore, they rely heavily on visual signification practices and have historically been the leading driver of advances in graphical technologies. This makes them ideal objects of study when examining animation trends, techniques, and representational practices. In this paper, we propose a novel methodological approach to analyzing animation in videogames, drawing on principles of Multimodality (Kress and van Leeuwen 2021; Jewitt 2009; Bateman, Wildfeuer, and Hiippala 2017) and Kinesemiotics (Maiorani 2021). As a variegated research area that focuses on communication across media, Multimodality provides a rich theoretical background, especially in the domain of Kinesemiotics, which focuses on movement-based communication in natural, hybrid, and digital environments. Drawing on the Functional Grammar of Dance (Maiorani 2017, 2021; Maiorani and Liu 2022) and its implementation in manual and digital annotation, the area of Kinesemiotics has expanded beyond the study of dance discourse and towards performance analysis in general, thus proving a flexible and adaptable approach. This method has considerable potential for systematically analyzing choreographed movements performed by characters in videogame environments. To demonstrate the value of this approach, we present a systematic analysis of movement in the popular fighting game *Street Fighter V: Championship Edition* (Capcom 2020), focusing on how gender-based stereotypes are coded in character movements. By comparing the same movements between female and male characters (e.g., a kick), we

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demonstrate how the game encodes gender norms through animation, i.e., how a move is conveyed as 'feminine' or 'masculine.' We conclude the paper by examining how representations on-screen are influenced by animation practices themselves, including motion capture direction. This research presents a novel methodological approach for investigating animation generally and has the potential to illuminate unconscious bias in the animation industry.

1. Introduction

In 2018, YouTube user sn0wsh00 uploaded a video from a *Batman: Arkham Knight* mod (a 'modified' game), which quickly went viral. The footage showed a cutscene with Batman and Catwoman walking outside onto a roof and conversing. This is nothing out of the ordinary; what made this video unusual is that a game modifier ('modder') swapped Batman and Catwoman's character models while keeping their original animations, meaning that Batman walked with Catwoman's animations and vice versa. The result was that Batman emerged from the building outstretching his arms dramatically, his hips swaying back and forth hyperbolically as he walked; Catwoman, in contrast, walks stiffly, her arms appearing to hold invisible kegs underneath them, her head and upper torso barely moving. The swap was generally viewed as humorous, as Catwoman's exaggerated femininity mapped to Batman's hyper-masculine frame presented a stark, somewhat absurd juxtaposition. However, while amusing, many also noted how the swap brought to light how gender stereotypes are coded in movement (e.g., Carter 2019). Even considering the exaggerated, idealized bodies of superheroes, the clip reinforces the Butlerian concept that what it means to be 'masculine' or 'feminine' is deeply ingrained and very much a matter of performance.

The representation of gender in videogames is one of the most well-established topics in game studies, appearing at the dawn of the field as an academic discipline in the late 1990s (Dietz 1998; Schleiner 2001) and persisting today (Malkowski and Russworm 2017; Vossen 2020; Rennick et al. 2023). Historically, representational analyses typically focused on visual and auditory content or how people look, dress, speak, and sound. Less attention has been paid to how meaning is conveyed through game movement, though there have been essential contributions in this area (e.g., Simon 2009; D'Armenio 2022). Through an analysis of movement in *Street Fighter V: Championship Edition* (Capcom 2020), a game in which players fight opponents in hand-to-hand combat, and drawing on Maiorani's (2021) concept of kinesemiotics, we argue that understanding the meaning of motion is an integral part of conducting representational analysis in videogames and other animated media. What does it mean to 'move like a woman,' or in our case, 'fight like a woman'? How might comparable actions – e.g., a kick, punch, or special move – differ between male and female characters? As we

demonstrate, there are indeed differences, and they map well with dominant conceptions of the masculine and feminine. Applying kinesemiotics to videogame animation is novel and has several scholarly applications, especially for those working in areas related to gender, race, and disability studies. We also hope that a clearer understanding of how movement reinforces entrenched stereotypes will benefit developers when animating their characters in games and other animated media.

2. Animation in games

The history of animation and videogames are deeply intertwined. As engineer, Ralph Baer – inventor of the first home videogame console – has noted, "[i]f not for videogames and their enthusiasts… advanced computer graphics would perhaps still be found only in the exclusive domain of universities and the high-tech world" (quoted in Bushnell 2013: 101). As videogames have progressed from two-dimensional, monochromatic entities (like *Pong*) to three-dimensional, ultra realistic-looking simulations, they require increasingly powerful graphics hardware, which, in turn, has bred innovations in animation styles and techniques. These innovations have not stayed within the domain of games, either, as cartoons, film, and seemingly unrelated disciplines such as cartography have also benefitted (Edler and Dickmann 2017). This close relationship makes sense; with few exceptions (e.g., *The Vale* from Canadian developer Falling Squirrel), videogames rely primarily on animation and other visual signifiers for communicating information. Generally speaking, players engage with a game's content by interacting with objects visualized on a screen; these objects can be directly manipulated (such as a playable character) or provide a setting in which to act (such as an environment). In addition, most games have a user interface (UI), which displays information such as health, inventory menus, objectives, etc. While each facet of visual communication in games is essential, we primarily focus on 3D character animations of people, as they are most likely to help us understand broader cultural norms, attitudes, and symbolic systems concerning gender and other identity markers.

Given the importance of animation in games, it is helpful to understand some of the processes and technical aspects that go into creating game animations. Game studios indeed use many of the same animation tools and techniques as other media like film (e.g., software like Autodesk Maya or 3DS Max, and hardware like Wacom tablets and high-powered graphics cards); however, games' interactive nature means there are several differences in how animations are developed and consumed. A critical difference between animating for video games versus non-interactive media like film, for example, is that the user typically has control over one or more animations in a game. This means that animators must liaise closely with other components of the development team, such as design, as they must account for all possible actions available to

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players. It also may mean that animators need to prepare more animations than film animators since players often have control over the camera in contemporary games, meaning they can view a character from many different angles and scenarios. In short, game animators need to surrender a degree of control and predictability to players, which film animators typically do not.

Like film, game animations are created differently depending on myriad factors, including the desired level of visual fidelity (e.g., realism), scope, dimensionality, and budget. While pipelines and processes differ according to studio practices, character animation typically involves a) concept art (usually a 2D iteration); b) 3D modeling (a general shape, few details); c) texturing (applying details); d) rigging (applying a skeletal frame for movement); and e) lighting and other visual effects (e.g., glowing lines to indicate fast movement). Once a character has undergone this process, it is put into a game engine (like Unity or Unreal) to ensure it works properly in the game. Like all animation, this can be a lengthy, resource-intensive process; one way to avoid some of the manual components of the process is using motion capture, or mocap, which, as it happens, was used in the development of *Street Fighter V*. Most high-quality mocap technology requires precise calibration of both space and equipment and so actors are typically required to come into a physical location to perform. Once in the studio, performance actors are outfitted with tight-fitting suits with ping-pong ball-sized markers attached to them. These are necessary for giving the cameras something to track and translate into a 3D image on a computer (usually appearing as a skeleton).

The number and placement of markers vary widely, depending on the project, degree of fidelity required, hardware/software, etc. Markers are typically placed on joints (elbows, ankles, shoulders, etc.) but can also be placed on other body parts – including the face – to generate a more comprehensive dataset. Generally speaking, the more markers employed, the more accurate the data. Movement actors are then given directions to perform a specified move or movement sequence. Once the movement data has been captured, it usually needs to be 'cleaned up.' For example, if capturing a walk cycle, there may be some 'jittering' in a leg, an arm can become detached, etc. Animators must then work in a piece of software to remove these issues. Once the mocap data has been cleaned up, animators can overlay a character model onto it. This is very cost-effective as a single rendered skeleton can be re-used as often as desired. In the popular game *Fortnite* (Epic 2017), for example, players can purchase 'emotes,' or dances which all characters can use; there are hundreds of characters to choose from in *Fortnite*, so allowing each character to perform a single dance move is very efficient, and often leads to humorous scenarios, such as Darth Vader doing the Macarena dance.

We outline the process in some detail to help demonstrate its deliberateness. Choices are made at every stage: hiring the actor(s), setting up the equipment, providing direction to the actor, cleaning up the data, and overlaying the data with a character model. If not careful, each choice can contribute to gender stereotypes, whether intentional or not.

3. Games and gender

As noted, gender representation in videogames is one of the most well-established topics in game studies, which emerged as an accepted academic discipline in the mid-1990s. In 1998, Dietz published a foundational survey of the portrayal of women in videogames in relation to violence, social roles, and behavior, highlighting the frequency of stereotypical and negative representations of women as subordinate to male characters. Almost ten years later, a study on the evaluation of gender stereotypes, based on a social-cognitive domain framework (Brenick et al. 2007), demonstrated that male character stereotypes that focused on strength and aggressiveness were viewed more positively than female character stereotypes, which were often hypersexualized to please male gamers, which in turn led to the exclusion of female gamers. The study also showed that while female gamers evaluated gender stereotypes more negatively, male gamers were more likely to condone stereotypical images. In 2009, Maiorani focused on avatars as multimodal representations and evaluated body feature choices available to players when creating their avatars (i.e., race, gender, color, body type); these choices would then determine possibilities and limitations in terms of avatars' movement-based communication, interpersonal relationships, and acquisition of skills.

Following a pioneering study by Bartlett and Harris (2008), Matthews et al. (2016) used Social Comparison Theory to compare body type model perception through videogames and other media to verify whether specific body features negatively impact female gamers' body image perception. They start from data that confirmed that the standard body types in videogames had tended to align with the typical heteronormative fantasies of hyper-muscular, strong male characters against hypersexualized female characters. The findings indicated that because hyper-sexualized female bodies reflected male fantasies rather than female fantasies, female gamers were not that affected by games in terms of their body perception. What is disconcerting is that the female avatar bodies keep on perpetrating female body imagery that portrays women as hypersexualized objects created solely for male gamers' enjoyment. More recently, Gray (e.g., 2014; 2020) has demonstrated the adverse effects of racial and gender-based stereotypes, especially among Black men and women gamers. She has persuasively shown that even when Black characters are represented in games, they often perpetuate harmful stereotypes relating to race and gender. With so much work on bodily appearance in avatars, we want to approach the problem of gender stereotypes in videogames from a different angle. Going beyond analyses of body type, skin color, clothing, and other static markers, our research focuses on how avatars' movement reinforces gender stereotypes, especially within female characters who are often hyper-sexualized in their animations. We argue that movement is an important yet understudied component of this representation as it is used to *perform* hyper-sexualization. We mainly focus on fighting games as movement is a central feature for all characters, male and female, and it is a prominent feature of these games.

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Representation in the specific area of fighting games has also been a common area of inquiry both in academic (Cassell and Jenkins 1998; Harper 2013; Thrasher 2015; Droumeva 2019; Sengün et al. 2022) and non-academic publications (Fussell 2015; D'Anastasio 2018). Gestures and movement in videogames have been studied in the past (Simon 2009; D'Armenio 2022), but these studies did not look specifically at movement in relation to gender. In their comprehensive review of the latest developments in terms of gender, race, and ethnic stereotypes in videogames, Şengün et al. (2022) focus on the broad cultural impact of fighting games, which is amplified by spin-off media products like films, comics, and sponsored tournaments. Gender, race, and ethnic stereotypes in these games, which present large rosters of playable characters, lead to problematic representations of minoritized groups and the hyper-sexualization of female characters in particular. They also tie these representational disparities to the fact that the videogame industry is mainly white-male-dominated, which is one likely reason why gender and racial stereotypes continue to persist in the industry. The study is based on investigating 64 characters taken from *Street Fighter V* and *Tekken 7*. It shows the negative impact of playing these and other fighting games on social behavior. It also shows that developers themselves seem to have problems in matching skin colors to races or nationalities and, therefore, end up with a skin tone palette that generally reflects a stereotypical 'Black or White' opposition. We build on this study and others as they do not tend to focus on how movement itself might generate bias and reinforce stereotypes. The following section outlines our primary methods for analyzing movement-based representation in fighting games: multimodality and kinesemiotics.

4. Methods: Multimodality and Kinesemiotics

Videogames are a semiotically rich medium, capable of utilizing virtually all modes of human expression (Ensslin 2011; Toh 2018; Hawreliak 2018). Although videogames rely heavily on animation to communicate information, animations are just one semiotic resource for developers. Multimodality is, therefore, a valuable framework to employ when analyzing videogames. While there is still debate about what constitutes a semiotic mode (Castaldi 2024), for our analysis, we take a broad view of the term as "a means for making meaning" (Jewitt 2009). In this conception, modes include still images, moving images, music, sound effects, gestures, writing, speech, haptics/tactility, etc. In short, a mode is a distinct way to signify information. Multimodality, then, looks at how individual modes combine to create meaning potentials (Kress and van Leeuwen 2021; Jewitt 2009; Bateman and Schmidt 2012). In a fighting game such as Street Fighter, the game employs

- **Moving image** (character movements);
- **Still image** (backgrounds);

- **Text** (e.g., character names);
- **Haptics** (rumble controller);
- **Music** (typically pertinent to the fight's geographical location) and
- **Sound effects** (grunts, special move calls, thuds, etc.).

These modes convey multiple forms of information to the player. The visual modes convey character aesthetics, such as physical appearance. Still, they also provide essential information about the game, such as player position (e.g., distance from the opponent), health bars, whether a hit has landed, etc. Each player has animations, including combat moves like punches and kicks, idling, celebrating victories, walking, jumping, and so on, which also help distinguish between characters.

In addition to these more established modes, videogames also employ the procedural mode, which refers to how games use rules, processes, and mechanics to signify information (Murray 1997; Bogost 2007; Hawreliak 2019). For example, suppose I wanted to signify that a particular character in a fighting game is powerful. In that case, I can use filmic modes like moving images (the character can be depicted as large, muscular, etc.) and sound effects (a loud thud for footsteps). Still, I can also provide mathematical information in a game engine, such as giving the character a high damage value. In fighting games, there are two primary values: health, the amount of damage a character can take before losing a round, and damage, the amount that a particular move subtracts from health when landed. I can define a variable – e.g., punch damage – and assign it a specific value indicating how much damage I want the player to inflict when throwing a punch, as seen below in pseudocode for two characters, Ryu and Cammy: [1]

Ryu punch Damage = 100;
Cammy punch Damage = 80;

In this example, Ryu has a stronger punch than Cammy since Ryu's punch inflicts more damage. I have communicated this information to the player via a rule (i.e., the amount of punch damage assigned to particular characters), which is semiotically distinct from indicating strength via image, sound, etc. In most fighting games, simple moves like punches are granted the same damage as these games are highly competitive, so it is essential to balance characters as much as possible. As we detail below, however, some moves are primarily for combat (winning a match) and moves that are mainly decorative and so serve less of a procedural purpose; the distribution of these moves, as one might expect, falls closely along gendered lines.

[1] These are arbitrary values used for the purposes of illustration.

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In the context of multimodality, while we will focus on animation (i.e., moving images) here, it is essential to note that other modes profoundly influence the meaning of a particular animation. Our analyses below demonstrate how movement reinforces gender norms already present in different modes, such as still and moving images (e.g., body type, clothing) and speech/sound effects (Droumeva 2019).

5. Kinesemiotics and the functional grammar of dance

As we are focusing on movement and what movement communicates through the interaction of body and space, the analytical tool we have used is the Functional Grammar of Dance (Maiorani 2021), and specifically, some of its features that are particularly useful in the application to choreographed combat movement in a controlled environment like the one in *Street Fighter*. The Functional Grammar of Dance (FGD) has been honed and successfully employed in international, collaborative research projects on movement-based communication in dance: *The Kinesemiotic Body*,[2] funded by the Arts and Humanities Research Council in the UK and the Deutsche Forschungsgemeinschaft in Germany and involving an interdisciplinary team of researchers based at Loughborough University (UK) and at the University of Bremen (DE) as well as the English National Ballet (UK). The FGD was created drawing on M.A.K Halliday's Functional Grammar (Halliday and Matthiessen 2013) for verbal language and Multimodal Discourse Analysis (Kress 2009; O'Toole 2011; Bateman et al. 2017). It is a model for the analysis of choreographed movement-based communication that focuses on how movement is structured and performed to create meaning through the interaction of body and meaningful portions of space (i.e., areas and/or spots in the communicative/performative context that are characterized by the presence of people, objects and/or props).

Several examples of analysis carried out on various dance solos performed in different contexts by different dancers (male and female) and in different styles (classical ballet and modern dance) have already shown that the use of the FGD implemented in ELAN[3] (a software to segment and annotate audio and video recordings synchronically by setting up semi-automated controlled vocabularies on an imported clip) annotation provides insightful discoveries of character-defining movement patterns that may not be immediately captured by the viewer but that generate specific meanings throughout the performance (see Maiorani et al. 2022 and Maiorani and Liu 2022; 2023). As dance choreographies are created to communicate identities, stories, ideas, and concepts, so are choreographies created for videogames. In the case of fighting games, movement

[2] https://www.uni-bremen.de/en/fb-10/forschung/institute/bitt/forschung-und-lehre/multimodalitaetsforschung-in-bremen/projekte/kinesemiotic-body
[3] ELAN stands for EUDICO Linguistic Annotator; it is a computer programme developed at the Max Plank Institute for Psycholinguistics (Nijmegen, The Netherlands). It is available for free and regularly updated to newer versions.

features can be analyzed to understand whether choreographed movement choices made by game developers generate meaningful stereotypes concerning gender.

The FGD is a model for the analysis of movement-based discourse and not a model for movement analysis like traditional notation systems (i.e., Labanotation, Benesh notation) that record only movement in the physical space with its physical qualities. For example, when used to analyze the different choices that different dancers may make when dancing the same role, our FGD-based analysis highlighted how different choreographed movements can define two different takes on the same character (Maiorani 2022); this type of analysis does not only record how various body parts move in space but how and what kinds of meanings they generate through the interaction with the surrounding space. These interactions are created through what the FGD defines as *projections*. While performing, dancers *project* towards the surrounding space by extending or turning their body articulators (arms and hands, legs and feet, head, torso) towards people, props, and objects, connecting extended body parts to surrounding people or objects, thus creating meaningful visual interactions. These interactions provide visual information that viewers can interpret about the context of the performance. Projections can also be directed to the audience, creating an 'involving' effect and thus breaking the invisible wall between them.

The foundational principle of the FGD is that movement-based communication, like verbal communication, always happens in a specific Context of Situation. The Context of Situation is the sociocultural and physical environment that anchors the act of communication to a particular place and time and informs – and is informed by – the communication itself. To understand how this dimension that is *external* to the semiotic system/s that is/are used to communicate is systematically incorporated in the message/s that is/are produced, we recognize that it can be defined by three variables without which communication would not happen: Field, the variable that accounts for what the communication is about; Tenor, the variable that accounts for who is taking part in the communication; and Mode, the variable that accounts for the ways meanings are organized and communicated. These three variables activate many types of meanings that, in the act of communication, will express the topic (experiential meanings) respectively, the type of relationships occurring among the participants (interpersonal meanings), and the relevant textual configuration that will provide the act of communication with a specific 'shape' (textual meanings). These meanings will be realized by specific semiotic structures depending on the semiotic system used.

In the FGD, these structures are the *choreographic affordances*, structured movements that the body articulators can perform to realize different types of projections (Fig.1). Projections happen in what the FGD theory defines as the *Contextual Space*, the space where the performance takes place and which is designed for the purpose populated by contextually relevant objects, people, props, etc. The FGD recognizes two different types of *projections* that realize two kinds of meanings necessary to carry out any communicative act:

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Narrative Projections, which indicate action directed and oriented within the contextual space of the performance (i.e., going to, coming from, locating, connecting, addressing, engaging, etc.), and Interactive Projections, which indicate interaction either with the viewers of the performance or with participants within the contextual space. On the other hand, choreographic units provide the 'shapes' through which we recognize the textual composition of a movement-based communication. The smallest of these units is the building block of our analytical system and of the movement-based discourse we can trace through the FGD: the Move. When applied to dance, the Move is the smallest structural unit of movement performed *across* the contextual space. Two sets of projections mark it: the starting set – the configuration of projections realized by the dancer before moving across space – and the arrival set, the configuration of projections realized by the dancer after having crossed the minimal space that is necessary to transition from the starting set to the arrival set. The FGD also looks at the way articulators can cluster (or not) to focus towards one direction (Modal values of Projections), and at Narrathletic Enhancers, those movements of different types (turns, jumps, etc.) that are included in moves and inserted in the narrative of the performance to showcase the athletic skills of the dancers. However, as we will see, these Narrathletic Enhancers are frequent in specific cases and have very different functions in fighting games.

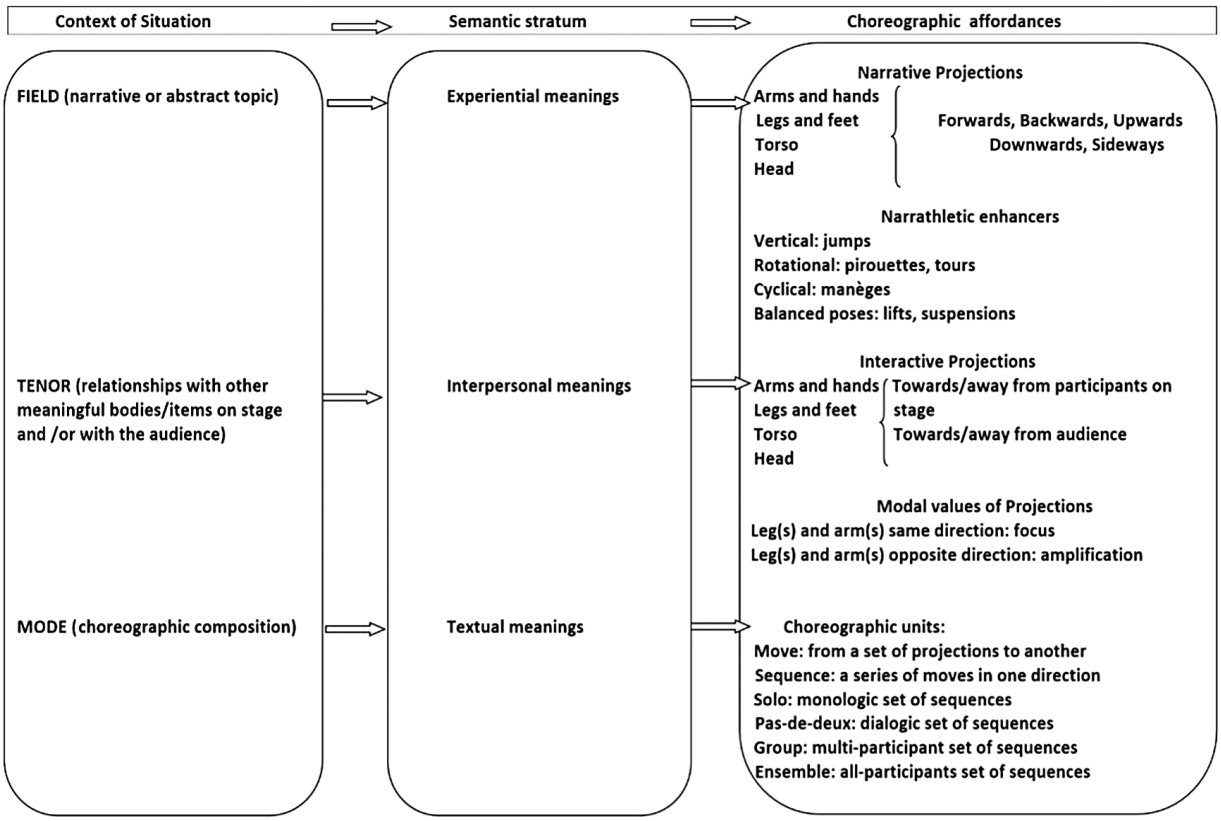

Figure 1. The most recent version of the Functional Grammar of Dance (Maiorani 2021:30)

6. Street Fighter V and the application of the FGD

Fighting Games are a logical starting point for applying the FGD model to videogames. While they are often fantastical and hyperbolic, fighting games typically animate fighting styles associated with various martial arts, including Kung-Fu, Capoeira, and Aikido. There is a close relationship between dance movements and martial arts; this is most clear in forms such as Tai-Chi, a Chinese martial art, and Capoeira, a Brazilian form that combines dance and combat, but there are similarities across many forms (Allen 2015; Mason 2022). Like dance, martial arts require fluid movement and the application of learned movements in novel environments. Additionally, Fighting Games are a valuable object of analysis as they typically include a large cast of playable characters from diverse demographic backgrounds. This allows us to compare movements and movement styles across demographic categories. Fighting Games are also a strong candidate for analysis because the genre has been popular for decades, has a thriving competitive scene, and has received extensive scholarly attention. Let's compare the setup of fighting games with the setup of dance performances. There are many fundamental features that the two have in common that allow us to justify the application and adaptation of FGD elements to the analysis of fights in videogames.

For starters, fights are staged like dance performances, and each character in Fighting Games is assigned and characterized by specific moves that will determine their efficacy or failure in matches. Fights also occur against backdrops that portray particular locations in time and space and include objects and background characters (usually portrayed as viewers who cheer or react to a knockout or K.O.). However, we had to consider several factors that led us to some adaptations in applying the FGD to the analysis of characters' movements in *Street Fighter V*, discussed below.

Secondly, the use of contextual space in Fighting Games is similarly well suited to an application of the FGD model: the game offers the player a choice among several backdrops populated by background characters, props, and objects in locations at a variety of times of the day. However, these backgrounds primarily serve an aesthetic rather than functional purpose, as characters cannot interact with them; instead, they are meant to provide a dynamic and atmospheric environment to the fights. Like in most Fighting Games, characters in *Street Fighter* only interact with each other on a horizontal plane with respect to the gamer (left side to right side of the game screen and vice versa), moving backward to get away from each other or forwards to move closer to each other, or performing jumps that send them up and down the screen. Projections are, therefore, only directed toward each other, though as we demonstrate below, there are clear differences in how movement is used between male and female characters.

Although any fighting game would be suitable for applying the FGD, *Street Fighter V (SFV)* has several advantages. First, it is one of the most successful and long-running franchises in videogame history. Its first installment in 1987 was developed in Japan

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and initially designed for arcade play. While this game was undoubtedly successful, its sequel, *Street Fighter II* (Capcom 1991), found new audiences and became one of the best-selling arcade and console games ever. The series has regularly released new versions, the latest being *Street Fighter VI* in 2023. Although there have been several changes to the games' character rosters and combat moves, the game's basic structure has remained the same: players select a character and engage in 1 vs. 1 fights against an opponent, who another human or computer may play. During the match, players can employ typical martial arts moves, such as punches and kicks, but also extraordinary and often entirely fanciful moves (like Ryu's 'Shoryuken' fireball). Each match has three rounds; the first player to win two rounds is victorious. In addition, SFV boasts a wide range of playable characters, each with their own aesthetic characteristics, narrative backstories, countries of origin, etc.

Moreover, there is a good balance between male and female characters; almost all boast ideal gendered bodies (i.e., muscular men and thin but curvy women). Significantly, besides being popular in entertainment gaming, *SFV* is also popular in eSports (competitive gaming). This means that although each character has individual strengths and weaknesses, developers go to great lengths to ensure balance in the character roster and not to give anyone an unfair advantage.

For this initial investigation, we adapted the Move as a unit of analysis because space is used in a minimal way for the fights, and the direction and orientation of the Moves are only determined by the way fighters hit each other, not by ongoing narratives where projections interact with space in different directions. We then considered the Move as the slightest movement in space marked by an *initial position*, which is usually static for all characters waiting to deliver or receive a blow, and a *blow position*, a striking set of projections that is achieved when a character manages to hit (or at least tries to hit) the opponent. For each Move in the fight (part of a fixed and limited repertory for each character), we considered projections in Initial positions and Blow positions as well as interim positions assumed by characters to prepare to deliver a blow and reset to the next Move after it. Because of the fighting function of Moves, which are primarily intended to strike blows to the opponent, we have decided to consider for this initial investigation arms with hands and legs with feet (head blows are very rare) as enacting Narrative projections having a primary Combat Function because these are the articulators that mostly enact the fight in its various phases; consequently, we have focused on head and torso for the Interactive Projections as having a primary Combat Function too, as these are the articulators that mainly indicate the attitude of each character towards the opponent and the viewer. As these fights also include very spectacular movements due to the characters' exaggerated muscular mass and physical capabilities, we have included Narrathletic Enhancers that appear very frequently, especially in characters' special moves.

7. Results (Game Analysis)

The analysis table below (Figure. 2) compares four characters in *SFV* while performing their signature moves: two female characters, R. Mika and Menat, and two male ones, Abigail and Vega. In terms of physical appearance, R. Mika presents all the features of a professional Western wrestler, though even more hypersexualized; in her default clothing (players can choose different outfits), her breasts are almost entirely exposed, as are her buttocks. Menat more closely resembles a fantasy character showcasing stereotypical features of ancient Egyptian culture combined with those of a contemporary gymnast (she has a crystal sphere that she handles like a ball, and she walks on toes albeit with a hypersexualized move of her hips). For the male characters, Abigail has all the features of a typical superhero villain with unrealistically huge muscles and hands; Vega, though lither and less muscular (but still well defined), combines the stereotypical features of a Spanish torero, dons a mask reminiscent of the Phantom of the Opera, and boasts a steel claw-like Wolverine from X-Men. Taken together, these four fighters provide us with a good starting point for analysis, as genders are evenly split, and some characters are more exaggerated/fantastical than others.

The Move has been broken down into four phases to provide evidence for our argument that female fighters are more frequently characterized by the performance of a considerable amount of superfluous movement within each Move that is not functional to combat (defense or attack) but that is instead functional to the showcase of specific hypersexualized body parts (i.e. enhanced breasts, buttocks, thighs, hips); moreover, these body parts are often revealed by these decorative moves due to very revealing clothes or gear that are lifted on purpose. For this reason, the function of this extra movement has been labeled as a *burlesque function* (BF), compared to moves primarily used for inflicting damage or a *combat function* (CF).

PF = Projections functions:
- **CF = combat function (defence-offence)**
- **BF = burlesque function (showcasing body parts)**

NH = Narrathletic Enhancer
- **J = jump**
- **T = turn**
- **B = balanced position**

The structures of the arms, hands, legs, and feet are interchangeable depending on whether the characters are moving towards one side or the other.

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Table of comparative special moves

Character and body structures	**Starting position**	**P F**	**N H**	**Path to blow**	**P F**	**N H**	**Blow position**	**P F**	**N H**	**Reset position**	**P F**	**N H**
R.Mika												
Right arm and hand (interchange-able side)	Bent downwards up forwards with fist	C F		Bent downwards up forwards with fist while jumping	C F	J	Straight upwards sideways in the air	**B F**	J	Straight sideways downwards in backwards somersault	C F	T J
Left arm and hand (interchange-able side)	Bent downwards up forwards with fist	C F		Bent downwards up forwards with fist while jumping	C F	J	Straight upwards sideways in the air	**B F**	J	Straight sideways downwards in backwards somersault	C F	T J
Right leg and foot (interchange-able side)	Bent downwards, calf down with foot flat on the ground	C F		Bent forwards, calf down with foot flat while jumping	C F	J	Straight upwards sideways, kicking opponent in the air	C F	J	Straight sideways downwards in bacwards somersault	C F	T J
Left leg and foot (interchange-able side)	Bent downwards, calf down with foot flat on the ground	C F		Bent forwards, calf down with foot flat while jumping	C F	J	Straight sideways, kicking opponent in the air	C F	J	Straight sideways downwards in bacwards somersault	C F	T J
Head	Straight forwards looking at opponent on opposite side	C F		Straight forwards facing viewer	C F	J	Straight forwards facing viewer	**B F**	J	Straight facing backwards	C F	T J
Torso	Straight behind thighs facing opponent on opposite side	C F		Straight forwards facing viewer behind thighs while jumping	C F	J	Bent sideways, facing viewer and showcasing breasts	**B F**	J	Bent forwards facing backwards, showcasing bottom and thighs	**B F**	T J

Table of comparative special moves

Character and body structures	**Starting position**	**P F**	**N H**	**Path to blow**	**P F**	**N H**	**Blow position**	**P F**	**N H**	**Reset position**	**P F**	**N H**
Abigail												
Right arm and hand (interchangeable side)	Straight forewords downwards with fist on floor	C F		Straight forwards upwards while jumping	C F	J	Straight upwards while in the air after somersault	**B F**	T J	Straight forewords downwards with fist on floor	C F	
Left arm and hand (interchangeable side)	Straight backwards perpendular, with fist	C F		Straight forwards upwards while jumping	C F	J	Straight upwards while in the air after somersault	**B F**	T J	Straight backwards perpendular, with fist	C F	
Right leg and foot (interchangeable side)	Bent forwards, calf down with foot flat on the ground	C F		Straight backwards upwards while jumping	C F	J	Straight upwards while in the air after somersault	C F	T J	Bent forwards, calf down with foot flat on the ground	C F	
Left leg and foot (interchangeable side)	Bent backwards, calf perpendular, foot not in line with toes on the ground	C F		Straight backwards upwards while jumping	C F	J	Straight upwards while in the air after somersault	C F	T J	Bent backwards, calf perpendular, foot not in line with toes on the ground	C F	
Head	Straight facing opponent on opposite side	C F		Straight forwards facing opponent	C F	J	Straight facing up while in the air after somersault	C F	T J	Straight facing opponent on opposite side	C F	
Torso	Bent forwards facing ground	C F		Straight facing ground while jumping	C F	J	Straight facing up while in the air after somersault	C F	T J	Bent forwards facing ground	C F	

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Table of comparative special moves

Character and body structures	**Starting position**	**P F**	**N H**	**Path to blow**	**P F**	**N H**	**Blow position**	**P F**	**N H**	**Reset position**	**P F**	**N H**
Menat												
Right arm and hand (interchangeable side)	Straight forward, perpendiular	**B F**	B	Bent forwards, perpendiular	**B F**	B	Straight sideways perpendiular	B F	B	Bent forwards, perpendiular	**B F**	T B
Left arm and hand (interchangeable side)	Straight forwards downwards	**B F**	B	Bent forwards, perpendiular	**B F**	B	Straight sideways perpendiular	B F	B	Bent forwards, perpendiular	**B F**	T B
Right leg and foot (interchangeable side)	Straight forwards downwards, with foot point touching ground	**B F**	B	Straight forwards upwards, foot, showcasing bottom	**B F**	B	Straight sideways perpedicular, facing back, hitting and showcasing bottom	B F C F	B	Bent backwards perpendular, foot in line, showcasing bottom and thighs	**B F**	T B
Left leg and foot (interchangeable side)	Straight supporting, foot flat on the ground	C F	B	Straight supporting on demipointe	C F	B	Straight supporting on demipointe	C F	B	Straight supporting on demi-pointe	**B F**	T B
Head	Straight forwards, facing back	**B F**	B	Straight facing opponent's side	C F	B	Straight facing opponent's side	C F	B	Bent backwards facing up	**B F**	T B
Torso	Bent forwards, showcasing bottom	**B F**	B	Bent sideways facing back, showcasing bottom	**B F**	B	Bent sideways facing back	C F	B	Straight facing ground, showcasing bottom and thighs	**B F**	T B

Table of comparative special moves

Character and body structures	**Starting position**	**P F**	**N H**	**Path to blow**	**P F**	**N H**	**Blow position**	**P F**	**N H**	**Reset position**	**P F**	**N H**
Vega												
Right arm and hand (interchangeable side)	Bent sideways, perpendiular	C F		Bent sideways, perpendiular	C F		Bent sideways, perpendiular	C F		Bent sideways up	C F	
Left arm and hand (interchangeable side)	Straight forwards, perpendiular	C F		Bent sideways, perpendiular	C F		Stretched sideways up	C F		Stretched sideways up	C F	
Right leg and foot (interchangeable side)	Straight forwards down	C F		Straight forwards down	C F		Stretched supporting	C F		Stretched supporting	C F	
Left leg and foot (interchangeable side)	Bent Backwards down, heel up	C F		Straight forwards down	C F		Stretched sideways up, facing front and hitting	C F		Stretched supporting	C F	
Head	Straight forwards, facing opponent's side	C F		Straight forwards, facing opponent's side	C F		Straight facing opponent's side	C F		Straight facing opponent's side	C F	
Torso	Straight, facing viewer to stretch arms	C F		Straight forwards, facing opponent's side	C F		Bent sideways facing viewer	C F		Straight facing back	C F	

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The table above has been adapted from the FGD to the combat modality in Fighting Games. It includes a description of the body structures performed by each character through the use of the articulators and the corresponding types of projections with relevant functions described as typical of this type of choreographed performance. The Move has been broken down into four phases marked by as many positions: the initial position (starting position in the FGD), the blow position (arrival position in the FGD), which ends with the delivery or the attempt at delivering a blow, and two interim positions that characterize the Move in the analysis of this type of combat where the contextual space is purely decorative, and where movement is choreographed so that projections supposedly fulfill the combat function in the aspects of defense or attack. These two interim positions have been singled out precisely because of the observation of the amount of extra movement that characterizes female characters before the delivery of a blow and before they reset to the following initial position.

The *path to blow* is an extra position that characters perform in preparation for the blow delivery; the *reset position* is the position they assume after the blow and before resetting to the initial position. Rather than mere transitions, these two positions mark strategic moments in the combat when a character performs a movement to maximize the effect of the blow (path to blow) and when they collect themselves before starting a new Move in the fight (reset position). These positions also provide micro-pauses to the game, allowing players to evaluate their fighting strategy. From this perspective, the reset position can also be considered an after-blow path. Limb articulators have also been combined into sets (arm and hand, leg, and foot) because of the primary combat function their projections are all supposed to fulfill simultaneously.

In contrast, the head and torso can project independently from each other. Each set of projections performed through a body structure created by the articulators has been labeled with its function, combat (CF) or burlesque (BF). Narrathletic enhancers have also been captured according to their types. Table 1 provides immediate evidence. In contrast, both female characters' Moves are characterized by many BF projections (with burlesque function, in bold in the table), while both male characters' Moves only feature CF (combat function) projections. Therefore, female characters' performance is a component that characterizes both their fights, often with spectacular narrathletic enhancers and the showcase of hypersexualized body parts, typical of burlesque.

The table also shows that while narrathletic enhancers are only present in the more classic male fighter, Abigail, who is also characterized by unrealistically huge body parts, these elements are not present in Vega, who can instead count on other 'weapons' to enhance the effectiveness of his blows. Abigail's narrathletic enhancers are used to deliver his blows, but Vega enhances his attacks through his Wolverine-like steel claws. Both female characters instead perform narrathletic enhancers: their function, though, is not only to enhance the effectiveness of their blow delivery.

The more classic R.Mika uses jumps to prepare and to deliver her blow as well as to showcase her breasts with her arms and hands straight up in the air; in her reset position, the jump and turn of the somersault that happens in the air after a blow have the only function to facilitate a full view of her naked buttocks and thighs when she lands back on the ground with her torso bent forward. On the other hand, Menat's movements on her toes do not provide extra balance to her blows: she uses them to enhance the swinging of her hips and the position of her buttocks and thighs. She does the same when preparing and delivering her blow, with her clothes shifting to reveal the lower parts of her body even more. The same burlesque show is prolonged by her reset position, which includes a turn that, in a real fight, would put her in a vulnerable position rather than allow her to reset for the next move. The gender bias perpetuated through movement is revealed by the objective analysis of comparable signature Moves using the same criteria for all characters.

This table is representative of the movement characteristics that are typical of several characters across genders that we have looked at, though not included in this paper (Kolin, Chun-Li, Dhalsim, Balrog, Cammy, Ryu, Blanka, Flake, Lucia). An interesting factor is that due to the movement features highlighted by the table, clothes in female characters move much more to reveal body parts during moves. In contrast, even loose clothes on male characters mostly remain in place. It is also noticeable that while all characters focus on each other with their faces, female characters tend to more often offer the view of their hypersexualized torsos to the gamer's look. In contrast, male characters' torsos are more predominantly facing the opponent.

8. Conclusion

This paper demonstrates the usefulness of applying the Functional Grammar of Dance and Kinesemiotics to movement-based communication in videogames. Our analysis shows that male character movements primarily have a combat function that indicates a damaging blow. In contrast, female character moves tend to involve greater decorative animations with little to do with combat. While there are certainly stereotypically gendered moves in *SFV that* can be ascertained at a glance (e.g., R. Mika's 'shooting Peach' move in which she attacks her opponent with her bare buttocks), the FGD allows us to break down individual moves into their constituent parts, thereby giving us a tool to analyze movement beyond what is visible superficially. Furthermore, these differences in movement correspond to other modal signifiers in the characters since their body shapes are almost invariably depicted according to gender-based ideals (i.e., super muscular men and thin but curvy women whose breasts and buttocks are exaggerated), and their vocalizations also tend to follow stereotypical gender representations. A multimodal approach is, therefore,

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helpful in understanding how *SFV* and media objects generally communicate conceptions of gender. By focusing on the under-studied area of movement in videogames, this study has the potential to make significant contributions to game studies, game development, and other animated media studies.

At this project stage, we have limited our scope to a handful of characters in the game and focused on gender representation. In future iterations of this project, we aim to expand our analyses to more characters, other game genres, and other identity markers, such as race, disability, and sexual orientation. There are different applications of the FGD, such as how representation might compare across animated media: how might gender be depicted in video games compared to an animated film or television show? We hope that the FGD will be utilized by scholars in a wide array of disciplines and applied to various media, animated and beyond.

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