Otocky: Adventures in Improvisational Musicking

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Abstract

This paper analyses the game Otocky (SEDIC 1987), focusing primarily on the innovative forms of musical participation it affords. Rooted in the experimental artistic practices of its creator Toshio Iwai, the game anticipated several contemporary topics in game musicking and game design. In fact, Otocky challenged coeval practices of musical creativity and improvisation; pioneered technologically augmented musical techniques; and subverted traditional notions related to foundational characteristic of (digital or analog) games. While being often referenced in relation to its musical advancements, Otocky will be here presented within its original context, focusing not only on its musical merits, but also on its avant-garde, ante litteram characteristics. In this sense, this paper intends to contribute to the historicization of Otocky, elaborating on the experimental cultural context that Iwai imported from media art.

Introduction

Otocky was released in 1987 by developer SEDIC and publisher ASCII Corporation for the Famicom Disk System, an add-on for the original Nintendo Famicom console. Notably, both *Otocky* and the Famicom Disk System had only been officially released in Japan, making the game difficult to access in the rest of the world. *Otocky* is a single player game, where the player controls the homonymous character, described in the game manual as Otocky, the warrior of sound (ASCII Corporation 1987, 1), floating over abstract landscapes (fig. 1).

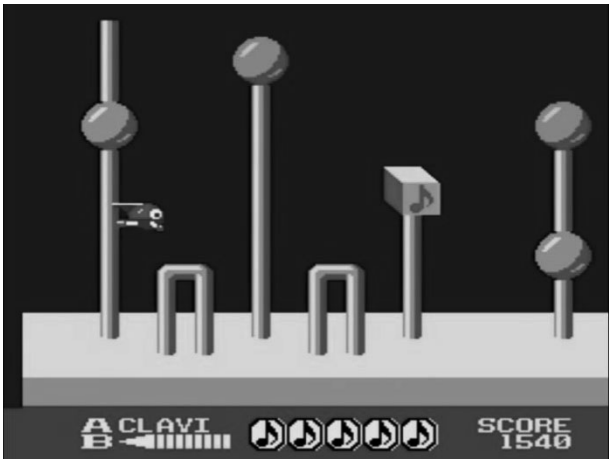

Figure 1. “Otocky Land”

The game offers three distinct modalities: “Game” Mode, “B.G.M. Mode”, and “Music Maker”. In Game Mode, the player directly controls Otocky, who is able to fly in eight possible directions. Swarms of enemies will routinely attack: they are presented in a similarly abstract style, with their aggressiveness manifested through grimacing expressions, menacing sets of teeth, or robot-like features. While little background story is discernible from the game itself, the game manual mentions a peaceful “Sound World” (ASCII Corporation 1987, 12), which suddenly collapsed for unspecified reasons. In any case, monsters are now stealing musical notes: it is Otocky’s mission to collect the notes and put them back into the Sound Monuments, thus restoring the peace.

The scarcely detailed, abstract scenario establishes a connection with music and sound, while serving as the backdrop for fairly simple game mechanics. The player can move around the whole screen and has the chance to either out-maneuver the attacking foes, or shoot them down. The shooting mechanic is comparable to the movements of a yo-yo: Otocky fires a “music ball” which travels a certain distance, before returning back to its owner. Up to two music balls can be present on screen at the same time. The music ball can be shot in eight possible directions: the player has to press A on the Famicom controller, plus the desired direction on the d-pad. Crucially, every direction is associated with a different musical note: pressing the A button will generate not only an attack, but will also play a

note. Due to the level design, the player is likely to frequently shoot in various different directions, therefore playing short, disjointed, but however continuous melodies. Moreover, the music ball is not only a weapon, but can also be used to collect objects: either the missing musical notes, or "A" and "B" bubbles. This is ultimately the most important function of the music ball, as the final scope will be that of collecting notes to access a boss stage: in this section, Otocky is set to repair the Sound Monuments, appropriately shaped like large musical notes, by placing back the notes in the cracks of the monuments. The game features 11 stages with different characteristics, each one ending with a different boss fight.

While what described so far arguably summarizes *Otocky*'s main features, the other two modalities of the game offer different affordances, crucially elaborating on *Otocky*'s innovative concepts. In "B.G.M. Mode", enemies are removed altogether: the player is free to wander around, collecting items without being challenged by swarms of attacking monsters. In this modality, the music ball ceases being a weapon, and is instead solely used as a musical device: the player's disposition can therefore reasonably abandon a competitive mindset, shifting to a musical one. In this modality, *Otocky* becomes a tool that focuses on extemporaneous musical improvisation. In the third modality, "Music Maker", the player can use game sounds to compose new musical tracks, using the console as a music tool. These new tracks can be used in a "play stage", similar to the B.G.M. Mode, where the original accompanying tracks are substituted with the player's own creations.

Otocky's "Game Mode" can be described as a musical variation on the classic themes of the shooter genre, sometimes referred to in Western contexts as shoot'em ups or shmups. In his article about the history of the genre, McMillan notes that "it is widely believed that the first published instance of the word 'Shmup' was in Commodore 64 magazine, *Zzap!64* Issue 3, July 1985" (2013). The magazine, published in the UK, also provides with a definition of the word: "A Zzap-coined term to replace the long-winded 'shoot-em-up'. Any game involving stacks of blasting and zapping" (McMillan 2013). While a full discussion about the history and characteristics of shooter games is beyond the scope of this paper, it is important to notice that Otocky presents distinct similarities with popular titles in the genre. Namely, the horizontal scrolling which had been first introduced by Defender (Williams Electronics 1981) appears in Otocky as well, while the trope of the final boss fight could be traced back to coeval examples, such as *Gradius* (Konami 1985). Otocky, however, notably lacks the sci-fi iconography typical of shooter games. While Hiroyasu Machiguchi, game designer for *Gradius*, has acknowledged in interviews that the development team was "very influenced by science fiction movies [such as] *Star Wars* and *Lensman*" (Shmuplation 2019), Otocky does not involve space combat or travelling (while however inheriting the monomythical narrative setting, with Otocky serving as the lone hero). Instead, the scenario is fantastical and cartoonistic.

Otocky's musical content

It would be limiting to consider *Otocky* only as a shooter game: its innovative characteristics are to be found in the musical affordances it provides. Starting from the game packaging, ASCII Corporation used musical symbolism to associate *Otocky* with music iconography: staffs and notes appear alongside a picture of the idol singer Natsuki Ozawa, prominently featured in the front (fig. 2) and back of the packaging, as well as in the game manual.

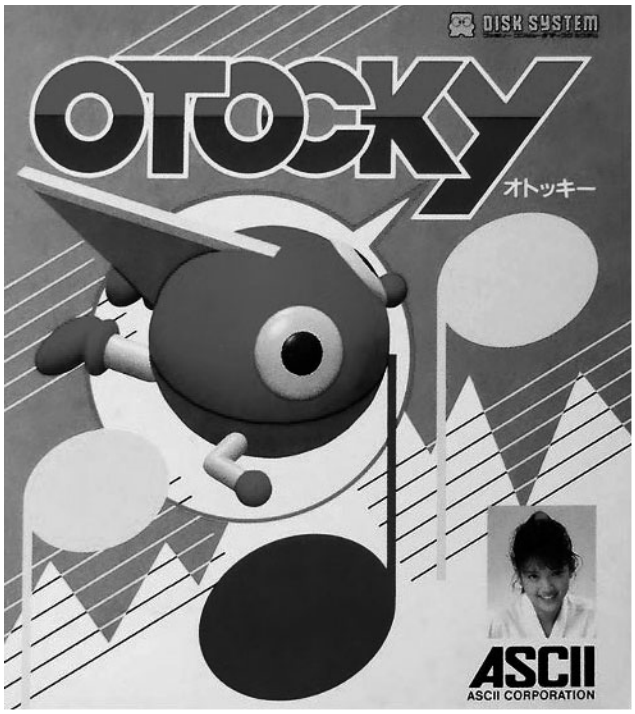

Figure 2. *Otocky* box art.

Arguably, the main feature of the game is connected with the ability to improvise, using the Otocky character and the music ball game mechanic. As mentioned, the

player can effectively control eight musical notes. While the pitch of the notes remains consistent to the assigned direction, the timbres vary greatly, allowing players to use 30 different musical instruments, such as organ, violin, brass, but also less distinct synthesized sounds, simply defined as "noise" within the game. The change is not only acoustic, but it is also reflected in the affordances of the music ball weapon: the ball will travel further, or change size, granting more or less efficient shooting. The variety of musical timbres available is a significant technological advancement, made possible by the original use of the Famicom Disk System hardware. The device increased the computational power of the Famicom, while adding compatibility with proprietary diskettes, a modified version of the Quick Disk format produced by Mitsumi (Altice 2015, 164). The peripheral was only available to the Japanese market. Crucially for *Otocky*, the Famicom Disk System features new, dedicated sound hardware, which augmented the capabilities of the machine by adding a new sound channel. In his extensive treatise of the Famicom console, Altice notes: "the Disk System […] used a rudimentary form of single-cycle wave synthesis that allowed composers to "draw" custom waveforms to any geometry […]. Exotic shapes were now at the composer's disposal" (Altice 2015, 268). The new audio channel is a central characteristic of the Famicom Disk System, and was in fact used by different games and composers, including Koji Kondo, celebrated author of many of Nintendo's familiar themes: "in Zelda's original disk release, Kondo used three different FDS wave shapes in the opening theme, sculpting a unique timbre for each section of the song" (2015, 268). Altice elaborates on the importance of the extra audio channel for *Otocky*:

> "Developer SEDIC built an entire game [Otocky] around the wave channel's switching capability […], one of the Famicom's most creative aural and visual experiments. The FDS wave channel voices all of *Otocky*'s A-button instruments […]. Limited to the APU's basic waveforms, such tones would be difficult or impossible to mimic, but the wave channel handles the game's rich orchestration with aplomb, shaping waveforms to approximate exotic timbres previously unheard on the Famicom. Even more impressive is how *Otocky*'s instrument-switching mechanic transforms a Disk System hardware limitation into an innovative gameplay system. No other FDS games were structured around the peripheral's audio channel like *Otocky*" (Altice 2015, 270–271).

Even if the music ball is *Otocky*'s main innovation, it is important to note that each level also includes a more canonic backing track, a pre-composed tune which serves as the musical backdrop for the player's musicking. Notably, in the first level ("Otocky Land"), the backing track changes dynamically according to variations in the game state (for example, picking a certain number of notes), adding layers of percussions and other variations in the arrangement as the session goes along. The player inputs are also rhythmically quantized in order to match the next available beat. Quantization techniques, which are commonly used in music production to eliminate possible rhythmic imprecisions in a recorded performance, are however also employed as tools for real time interaction between computer and performer:

> [quantization] is also important for compositions with a real-time, interactive component where the computer improvises or interacts with a live performer […]. A quantization tool would make it possible to study the expressive timing of music for which no score exists, as in improvised music (Desain and Honing 1989, 56–57).

In that sense, the use of quantization in *Otocky* is a fairly sophisticated example, applying the technique to the unique setting of digital games, while maintaining the characteristics described by Desain and Honing.

Ergodic Musicking with *Otocky*

How can the player's activities be theoretically explained? On one hand, *Otocky* presents a canonic game situation, with enemies to beat and stages to complete. On the other hand, the game matches that with an (arguably) equally relevant musical components, juxtaposing musical sounds with shooting. *Otocky* is therefore a prime example of ergodic musicking (Oliva 2019, Oliva and Poutiainen 2022), in that it blends ergodicity and musicking. The concept of ergodic musicking is intended as a theoretical construct, capturing diverse forms of musical participation within the context of digital games:

> The intersection of ergodic effort and musicking practices manifested in digital games generates a new

> musicking form: ergodic musicking. Ergodic musicking is identified as a modern form of musicking, capable of deconstructing established musical roles such as composing, improvising, or dancing. Ergodic musicking, however, is not just a mixture of previous forms: it is instead a unique musicking (Oliva 2019, II)

As introduced by Aarseth, ergodic here refers to "nontrivial effort required to allow the reader to traverse the text" (1997, 1). While linear media, such as books or movies, are generally arranged to render their contents materially accessible to the user, digital games are instead constructed to require nontrivial effort in order for their content to be experienced. In that regard, digital game players are materially involved in operating the cybermedia: "the ergodic signifies the general principle of having to work with the materiality of a text, the need to participate in the construction of its material structure" (Klevjer 2002). Engaging with *Otocky* requires ergodic effort, as the player manipulates its mechanical system, traversing and reconfiguring it according to their input and to the game's affordances and constraints. This activity, however, also involves substantial musical value. Musicologist Christopher Small introduced the concept of musicking, directing attention not on the musical object, such as musical scores or recordings, but rather on diverse forms of musical participation: "The fundamental nature and meaning of music lies not in objects, not in musical works at all, but in action, in what people say and do […]. To music is to take part, in any capacity, in a musical performance, whether by performing, by listening, by rehearsing or practicing, by providing material for the performance (what is called composing), or by dancing (1998, 9)". Technologically mediated forms of musicking are also considered: Borgo (2007, 2013), focuses specifically on transmusicking, understood as an umbrella term covering diverse, new forms of musicking made possible by digital and interconnected technologies. He argues that these diverse phenomena share "an orientation that questions presupposed boundaries between composers, performers and listeners, or those between music conceived as product or process" (2013). Musicking research is therefore increasingly focused on technologically mediated aspects: "Small did not explicitly discuss mediated music performances. Nowadays, when the musical experience is inescapably a technological experience (Beer 2010), the mediated aspect in musicking cannot be ignored" (Rautiainen-Keskustalo 2021, 2). It is within this context that Landy asks: "Yet, is it not true that […] the computer game also form[s] new ways of musicking?" (2007, 8). Ergodic musicking is positioned within this theoretical frame, capturing diverse forms of musicking happening during engagement with digital games. Examples of ergodic musicking include cases of dynamic musical systems, in which "the final musical output that is actualized during a given play session is directly correlated with the player's activities" (Oliva 2017), even if "the music programming does not make obvious precisely how it responds to the game action" (Summers 2020, 102). However, "Ergodic musicking […] could account for the wider forms of musical participation invited by music creation games—such as performing, improvising, or dancing—and thus investigate their influence on the interactive composition experience" (Studley, et al. 2022, 30). In this sense, *Otocky* is a primary example of ergodic musicking; moreover, it has foundational value, in that it predated contemporary examples of ergodic musicking.

Interactive, adaptive, procedural?

The nature of the sound interactions afforded by *Otocky* has been the subject of significant academic debate, often focusing on the innovative aspects introduced by the game. While *Otocky* has been considered (perhaps diminutively) as "the humble origins" of the music game genre (Pichlmair and Kayali 2007, 424), various sources refer to the procedural or generative aspect of *Otocky*'s music: Collins underlines that "Japanese composer and artist Toshio Iwai has been behind some of the most innovative procedural techniques in game audio. As early as 1987's *Otocky* […], Iwai incorporated procedural techniques" (2009, 7). Similarly, Moseley and Saiki note that *Otocky* is "an improvisatory music-themed *shoot'em up* with a procedurally generated soundtrack" (Moseley and Saiki 2014, 59). The ability of *Otocky* to "generate" music is also discussed by Altice, who considered *Otocky* as "a generative music game presaging titles like *Rez* (2001), *Lumines* (2004) and *Bit.Trip Runner* (2010) by more than a decade" (2015, 270). *Otocky*'s relevance in this aspect has also been addressed by popular journalistic sources, such as the music magazine *Rolling Stone*, which listed the game within "The Top 20 Music Games of All Time": "Think generative music content is a modern-day thing? Think again. While *Rez* gets most of the credit for allowing players to directly influence the background music through

their actions, *Otocky*—which does exactly the same thing—predates it by 15 years" (2011).

As discussed elsewhere (Oliva 2019, 216–220), the nature of *Otocky* as procedural or generative is debatable: within the context of this paper, it is important to recap the various, different functionalities of the audio mechanisms used in the game, differentiating between interactive, adaptive, and procedural sounds. *Otocky* establishes a very direct correlation between musical output and player action: pushing the A button together with a direction triggers a musical note. Collins defines similar occurrences of sound events in digital games simply as interactive audio: "interactive audio refers to sound events directly triggered by the player, affected by the player's input device (controller, joystick, and so on). The player's input actions nearly always affect the soundscape of the game, from adding simple footsteps when the player clicks or holds movement buttons, to shooting sounds upon pressing a fire button" (Collins 2009, 5–6). The soundscape of *Otocky*, here loosely understood as the sum of its acoustic components, is however dramatically impacted by the interactive sounds controlled by the player, since they are harmonically preset to always match the background tracks. From a technical perspective, the music ball mechanic should simply be understood as interactive sound, and is in that respect not different from many other possible examples in which players push a button to trigger a sound. This particular mechanic does not seem to be involved in any procedural process of sort: the player input, as mentioned, is actually only mediated by a subtle but effective real-time quantization.

There, is however, a level of responsiveness in the background track as well, considering it presents elements of adaptive audio. "Adaptive audio events […] are unaffected by the player's direct actions, although they are inevitably affected by indirect actions. Adaptive audio events are cued by the game's engine based on in-game parameters, and are therefore rarely immediately repeatable. These may include the general locations (as in place, such as 'in the village', or time of day, such as 'night', based on system clocks), scripted or unscripted events (it may be that the player needs to gather certain objects before a particular character will react in a specific way, for example) […], and so on" (Collins 2009, 6). The list of typical occurrences provided by Collins is applicable to *Otocky* as well: as mentioned, in the level "Otocky Land", changes in the game state prompt changes in playback of the background track. Similarly, in every level of the "Game Mode", gathering enough musical notes will move the action in a different game area, which is also accompanied by a different musical theme.

While instances of interactive and adaptive audio in *Otocky* are fairly canonic, the presence of more complex audio techniques is debatable. Collins defines procedural music as a "composition that evolves in real time according to a specific set of rules or control logics" (2009, 13)". Within this large class of systems, generative algorithms are among the most complex examples: they "increase the overall musical data size in that the basic musical materials are themselves created. Due to the difficulties in composing effective procedural music for games, the vast majority of algorithms controlling music in games [are not] truly generative in the traditional sense" (Collins 2009, 7).

With this definition in mind, it appears evident that *Otocky* does not actually feature any generative algorithms: the "basic musical materials" are all already preset, and the player can only engage with them as interactive sounds. These functionalities are "however not comparable to the properties of transformative or generative algorithms, which […] are usually much more substantial" (Oliva 2019, 219). However, the technical innovations of *Otocky* remain relevant: particularly, the ingenious use of the Famicom Disk System wave channel. In order to fully appreciate the innovative nature of *Otocky*, it will be necessary to address the improvisational nature of the involved musicking.

Improvising with *Otocky*

While engagement with *Otocky* has been so far described as a form of ergodic musicking, I will now discuss how music is "generated" while playing the game. The focus is not on the technological characteristic of the software, but rather on the musicological nature of the ergodic musicking in place, arguing for a focus on the extemporaneous, ephemeral nature of the musical activities in *Otocky*.

> "As previously noted, Moseley and Saiki considered *Otocky* as "improvisatory" (2014, 59). Improvisation remains a rarely considered possibility when it comes to musical engagement with digital games; famous examples such as *Guitar Hero* (Harmonix/RedOctane, 2005) and *Rock Band* (Harmonix, 2007) focus in fact on skillful execution of popular songs. For the ambitious player of these latter games, it is helpful to be already familiar with the compositions at hand, as

every detour from the provided notation will be penalized as a mistake by the game system. In that sense, it can be said that *Guitar Hero* and *Rock Band* do not afford musical expression[1] (with the notable exception of tremolo effects, accessible with the guitar controller's whammy bar), let alone improvisation. The musicking of *Otocky* is radically different: there is no definite composition to follow, and the musical output of the player is disconnected from the point or progression systems. In this sense, the musicking of *Otocky* presents aspects related to improvisation, in that the finality of the musicking is not directed toward musical composition, or anyway the repetition of certain musical patterns (pre-fixed or otherwise). Instead, the performances remain extemporaneous, unique, and not repeatable. Moreover, the elusive theorical nature of *Otocky*'s musicking affordances are reminiscent of Bailey's famous understanding of improvisation: "improvisation enjoys the curious distinction of being both the most widely practiced of all musical activities and the least acknowledged and understood. [The subject is] too elusive for analysis and precise description: essentially non-academic" (Bailey 1993, IX). Despite Bayley's remarks, the field of improvisation studies "has grown considerably in recent decades, with the publication of numerous scholarly books and articles on the subject, and with the emergence of academic journals, conferences, and graduate programs with improvisation as a central focus" (Borgo 2022, 18). Moreover, Borgo also notices that improvisation is studied under a multidisciplinary lens, extending "well beyond the arts into fields such as education, philosophy, sociology, anthropology, ethics, literature, law, postcolonial studies, gender studies, human–computer relations, sports, and medicine, to name only a few (2022, 19)". Within game studies, musical improvisation remains however generally understudied[2]. I argue that the improvisational ergodic musicking afforded by *Otocky* is close to what Borgo calls referent-based improvisation, elaborating on the terminology introduced by psychologist Jeff Pressing (1998):

> "Pressing may best be known for the notion that a referent is used in most improvised music performance. His most succinct description of a referent was "a set of cognitive, perceptual, or emotional structures (constraints) that guide and aid in the production of musical material (Pressing 1998, 52) […]. Pressing's notion of a referent was quite open-ended. It could be in time—either with a pulse (a "clocked referent") or without one (a "sequenced referent")" (Borgo 2022, 24).

In *Otocky*, the referent is distinctively clocked, considering that a rhythmically rigid background music will be played, largely unaffected by the player's input. The constraints, also, are technologically maintained, considering that the presence of real-time quantization determines a fairly limited number of possible rhythmic figures. However, the referent in *Otocky* is also contextual, and not simply dictated by the tangible design constraints of the game: the player's predisposition toward performing musically is not a given, as it is any other form of predisposition toward the game-playing activity. The accounts of improvisation provided by Borgo are largely related to musicians operating in an unambiguous musical context, which makes them presumably fully aware of the musical nature of the performance they are participating into. While, as mentioned, *Otocky* strives to be associated with music, starting with its box art, the context of digital games is not necessarily associated tout court with musical situations (particularly so when the game was originally released, arguably). Iwai himself describes engagement with *Otocky* as a musical discovery: "as [the players] proceeded through the game, a point would come when they would realize that what they were in fact doing was composing music" (1994, 23). While Iwai's account is a reasonable description of player's possible attitudes, other perspectives can of course be manifested. For example, a given player could choose to mute the game altogether: in this case, the game remains playable and traversable in its entirety, although of course the acoustic content would not be experienced. Commenting on the shifting nature of players' motivations and predisposition, Aarseth and

[1] Here intended in its musical meaning: "musical expression, that element of musical performance which is something more than mere notes […], the finer musical points [that] are more difficult to indicate and must eventually stem from the performer himself or from a performance tradition with which he is familiar" (Encyclopaedia Britannica 2007).

[2] I discussed the topic further in "*Otogarden*: Exploring Musical Improvisation in Video Games" (Oliva and Poutiainen 2022).

Calleja have already clarified that "the objects we call digital games are not games in and of themselves. They are software applications that are designed to afford one or several simultaneous game perspectives […]. What makes any of these systems such is, ultimately, the subjective ludic perspective taken on it" (2015, 1). The personal perspective and inclination on musical improvisation could therefore dramatically influence the nature of *Otocky*'s musicking, which could reasonably be more or less explicitly improvisational depending on the player's inclination. In his philosophical account on creativity and improvisation in game performances, Nguyen proposes a fitting analogy: "we could hold that each particular playing of a game is a distinct performance – and that each performance can have its own distinctive artistic merit. Under this conception, the player is also a kind of artist, who creatively contributes in an artistic manner. What, then, is the relationship between game designer and game player? One parallel springs immediately to mind. We could conceive of the game designer as something like the composer of a jazz standard, and the game player as something like a jazz musician, improvising a new performance of that standard each time" (2022, 686).

Regardless of the players' inclinations, *Otocky* remains however a designed object, with determined and specific affordances and constraints. In this sense, it can be useful to conceptualize *Otocky* within the larger frame of "work in movement", as introduced by Umberto Eco:

> "The "work in movement" is the possibility of numerous different personal interventions, but it is not an amorphous invitation to indiscriminate participation. The invitation offers the performer the opportunity for an oriented insertion into something which always remains the world intended by the author" (Eco 1989, 19) .

Eco's comment is referred to musical compositions which specifically include various levels of indeterminacy:

> "a number of recent pieces of instrumental music are linked by a common feature: the considerable autonomy left to the individual performer in the way he chooses to play the work. Thus, he is not merely free to interpret the composer's instructions following his own discretion (which in fact happens in traditional music), but he must impose his judgment on the form of the piece, as when he decides how long to hold a note or in what order to group the sounds: all this amounts to an act of improvised creation" (Eco 1989, 1).

The musicking eloquently described by Eco is applicable to the relationship *Otocky* establishes with its players. While it is possible to consider player's performances as artistically meritful, as noted by Nguyen, the confine of the performance space in *Otocky* (as well as in other game examples) is set by the affordances and constraints of the designed object: as such, regardless of the personal predisposition of the given player, in-game activities can be understood as "oriented insertions" into the game design conceived by Iwai.

AV-Game I and *II*

I have so far described *Otocky*, its musical affordances, and its relevance within contemporary game studies. It is however necessary, in order to fully understand the innovative attitude that *Otocky* brought forward, to briefly mention Toshio Iwai's practice and path. Iwai can be described as a multimedia artist and creator, whose production spans decades, and includes artworks, musical instruments, digital games, TV shows, and more. While "as media artist, Iwai possesses formidable credentials" (Moseley and Saiki 2014, 59), his works "include the creation of characters and computer graphic designs for Fuji Televisions, "Einstein TV" and "Ugo Ugo Lhuga" TV programs" (NTT InterCommunication Center [ICC] 2011). Moreover, Iwai also designed a musical instrument for the Yamaha corporation, the *Tenori-On*, while "the latter stage of his career has transformed him into a successful author of illustrated children's books. The three-volume series "A House of 100 Stories" (2008–2014) has sold well and been translated into several languages" (Huhtamo 2016, 92). This plethora of different expression venues also includes digital games: while *Otocky* is Iwai's first commercially available game, his most popular title is probably *Electroplankton* (Nintendo 2005) for the Nintendo DS portable console. In any case, Iwai's venture into digital games is a direct continuation of specific aspects of his artistic practice. In fact, *Otocky* maintains and expands the experimental, investigative attitude of two previous artworks: *AV-Game I* (Iwai 1986) (fig. 3) and *II* (Iwai 1987).

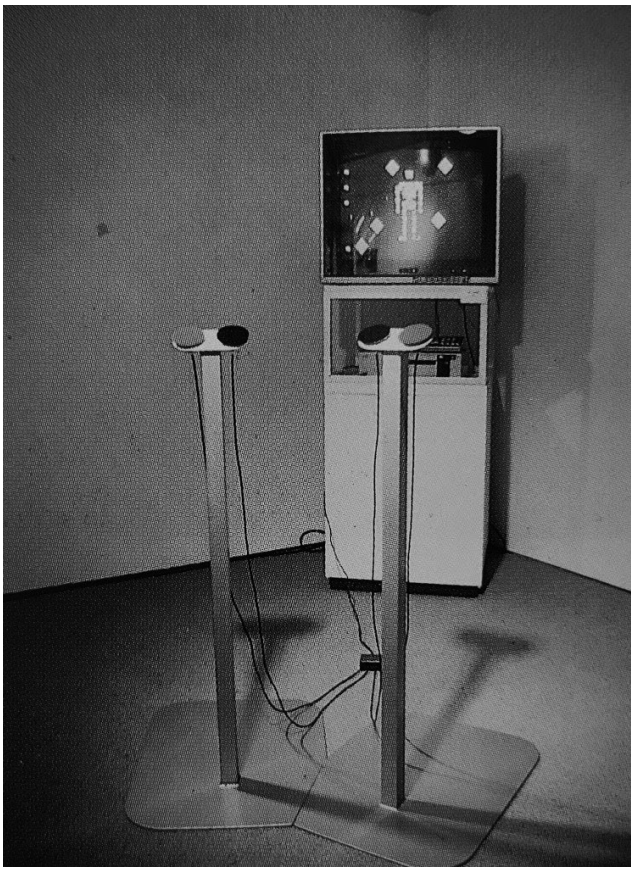

Figure 3. *AV-Game I.*

Not much documentation related to these works remains, but Iwai offers a description of them in the catalogue of an exhibition held at the ZKM - Center for Art and Media Karlsruhe in 1994:

> "I too was carried away with video games in the middle of the mid-1980s video game boom. The thing that excited me most about them at that time was how computers were essentially machines to interactively and simultaneously control audio and visuals […]. Yet video games were all about getting points and competing with others. That wasn't what I was looking for a more physiological aspect – a device which would offer the pleasure of unifying myself with audio and visuals – when I created this work." (Iwai 1994, 22).

Iwai's fascination with digital games and the "unification" of audio, visuals, and user appears connected to what Collins would define, decades later, as kinesonic synchresis. While film scholar Chion originally refers to synchresis to describe "the spontaneous and irresistible weld produced between a particular auditory phenomenon and visual phenomenon when they occur at the same time" (Chion 1994, 63), Collins argues that "interactive sound in games is kinesonically synchretic: sounds are fused not to image but to action" (Collins 2013, 32). In other words, players cognitively weld together into a discernible event the simultaneous occurrence of a movement on screen, an audio being played, and an input being provided (such as pushing the A button on the Famicom input device). The *AV-Game* series is therefore focused on "unifying [one]self with audio and visuals" by removing traditional game elements, seen as an obstruction to a particular, visceral brand of kinesonic synchresis. The functionalities of *AV-Game* are described by Morioka:

> "[In] *AV-Game II*, […] the pressing of several switches in an appropriately rhythmic manner allows simplified human images on the screen to start movement with music being automatically performed at the same time. This work has been programmed so that, even if the switches are manipulated at random intervals, the resultant melodies and rhythms are produced in a manner regular enough to make it an 'interactive work' - allowing for the sensual involvement of even the most untutored player" (Morioka 1995).

Furthermore, Iwai explicitly refers to the improvisational musicking involved in the *AV-Game* series: "the performer can recall the melodies just performed and improvise on top of them, endlessly" (Iwai 1994, 22). This understanding of musical improvisation, mediated by an interface inspired by digital games and available to "the most untutored player", as described by Morioka, is an example of ergodic musicking, while also echoing Bayley's comments regarding improvisation, described as "an activity of enormous complexity and sophistication, or the simplest and most direct expression" (83, 84).

Otocky's gameness

In Iwai's words, *Otocky* "featured a concept similar to AV-Game, [yet it] borrowed the format of a shooting game" (1994, 22–23). In this sense, *Otocky* features canonic game elements, somewhat contradicting one of Iwai's objectives: "[I] always wanted to create creative software played on the game platforms other than game software. This concept has not changed since *Otocky* right through to *Electroplankton*" (Riley 2006). Granted, the blending of free form musicking

and competitive elements is unique: "curiously […], *Otocky* stands as both the first and one of scarce few single-player games to situate playful music making within a traditionally competitive game framework" (Studley, et al. 2022, 30). The playfulness described by Studley et al. is not found in games following the *Guitar Hero* paradigm, in which, as mentioned, "the player is [either] right or wrong" (Kassabian and Jarman 2016, 123). The lack of tangible evaluation of the produced musicking in *Otocky* is also noted by Moseley: "the software [has an] ambiguous ludomusical orientation […]. The player may choose to prioritize the creation of an optimally pleasing soundtrack over the efficient pursuit of ludic goals" (Moseley 2016, 259). This juxtaposition between game and non-game, or competitive activity and freeform musicking, is exemplified by the aforementioned three modalities available in *Otocky*. Specifically, the B.G.M. Mode explicitly removes competition elements. By subtracting canonic game elements (point systems, enemies), Iwai also arguably predated current game design challenges. In 2019, Juul published an analysis of independent digital games (2019, 211–235), noting how contemporary game makers experiment with game templates, often creating liminal objects. He advocates for scholars to distance themselves from normative definition of "games", and rather to embrace experimentation within the media form. The current status of games is therefore not determined by their formal properties and characteristics, but rather by shifting cultural, social, and historical contexts. This concept echoes Aarseth and Calleja, who state that "the phenomenon of games is not a formally definable set but a historically constructed notion" (2015, 2). In particular, Juuls refers to Eastgate, the developer of *Storyspace* (Eastgate Systems 1987), a tool for creating hypertexts. He argues that the software has certain game-like features, and yet it was never presented as a game:

> "In 1987, games were associated with the nonserious, there were few institutions or venues that would support games, and for Eastgate, differentiation from games was necessary to make their works understood and distributed. By 2012, there was support to be had in terms of communities, reviewers, and game festivals" (Juul 2019, 220).

It is interesting to note that, during the same year of 1987, but in a different country and cultural context, Iwai was already challenging expectations from games, by transferring elements of his artistic practice into a commercially available digital game. While Iwai's merits as anticipator of the music game genre are abundantly recognized in the game studies literature (as reiterated throughout this paper), *Otocky*'s innovation in this sense is largely unnoticed. Collins describes the cultural context of two other games designed by Iwai, *Sim Tunes* (Maxis 1996) and *Electroplankton* (Nintendo 2005): "with no set objectives, rewards or in-game narratives, these and similar interactive tools—while sold and marketed in the games industry—are arguably not games, but rather musical toys that use game interfaces (see Herber 2008; Magnus 2007)" (2009, 7). Collins' comments are actually largely applicable to *Otocky*'s B.G.M. Mode, which has in general received much less attention than the (admittedly) prominent Game Mode. By connecting the B.G.M. Mode with Iwai's artistic production and with the modern experimental attitude toward game design, it becomes evident that *Otocky* has also predated current trends not necessarily related to music games, and is to be considered as one of the first commercially available games to omit enemies and competition elements.

Otocky is completed by a third modality: the Music Maker mode. Similarly to the B.G.M. Mode, this mode of the game does not present traditional game-like elements, yet it tackles a different musicking modality: composing. The Music Maker mode can only be unlocked once the Game Mode is completed, and is therefore not readily available. The mode makes available a graphic interface comparable to that of digital audio editing software. The website StrategyWiki describes Music Maker in detail: "This mode allows you to program up to four measures of music, divided into 8 eighth notes per measure. You have quite a number of options when designing your composition. Along the left side of the screen, the music is broken up into four "voices" and one percussion sound (on the bottom). For each voice and percussion, you can set the volume (the orange bar, which defaults to the maximum of 15), and which sound font you would like to use. Use A button and B button to cycle through the options" (StrategyWiki 2009).

In essence, the Music Maker mode allows players to access the sonic possibilities of the Famicom Disk System to compose tracks with the same timbres of the original *Otocky* backing tracks. While this feature is reminiscent of

other coeval games, such as *Doremikko*[3] (Konami 1987), the music composition activity is subsequently connected back to improvisatory practices, as the player can use the newly prepared composition to improvise on it using a mode similar to the B.G.M. mode (the "play screen"). It is perhaps a peculiar modality of composition, as the purpose of the composed pieces is to be used as basis for improvisation. The manifold and complex relation between composition and improvisation finds in *Otocky* yet another example, albeit a very unique one. In his philosophical enquiry, Lewis clarifies a crucial point:

> "Improvisation should not be considered merely to be the polar opposite of composition. Many improviser composers, often taken by the public to be "mere" improvisers who are not in any sense composers, employ a range of methods and techniques, both predetermined and otherwise, using both traditional and alternative forms of notation, or non-notational performance instructions, or none at all, to realize their music in performance. To think that one is *either* improvising *or* playing a precomposed notated work is to endorse a false dichotomy" (Lewis 2019, 14–15)

Applying this reading of the multifaceted reality of musicking in practice reveals, within *Otocky*'s Music Maker mode, the existence of a close dialogue between composition and improvisation, whereas the affordances of the game facilitate an exploration of a spectrum of musicking modalities.

Conclusions

This paper intends to position *Otocky* for its unique characteristics and innovations. *Otocky* has been referred to as the progenitor of music games (Pichlmair and Kayali 2007, 424) and as an anticipator of dynamic audio techniques (Altice 2015, Collins 2009, Herber 2008, Moseley and Saiki 2014, Oliva 2019). However, the "generative" or "procedural" nature of its audio system is debatable; rather, it is useful to shift attention from the technological nature of audio computation to the musicking afforded by the game design. In this sense, *Otocky*'s audio features a remarkably wide palette of ergodic musicking forms (Oliva 2019, Oliva and Poutiainen 2022), serving as an excellent example of the multifacted nature of musical engagement with digital games at large. *Otocky* provides with distinct opportunities for musical improvisation, arguably favoring a playful inclination on game objectives and musical activities. The brand of ergodic musicking in *Otocky* is positioned as a form of clocked, referent-based improvisation (Borgo 2022, 24): while its main affordances are arguably oriented toward extemporaneous, ephemeral musicking, the game also involves elements of musical composition. The Music Maker mode, in this regard, provides a synthesis of ergodic musicking, confirming previous accounts (Lewis 2019, 14–15) related to the continuity between composition and improvisation.

This paper also intends to contribute to the process of historicization of *Otocky*, elaborating on its relevance beyond the musical sphere. *Otocky* constitutes an early example of non-game, including a modalitiy, the B.G.M. Mode, which omits distinct game characteristics such as a winning condition, repurposing its game interface to serve musical intentions. The process of historicization is also paired with the analysis of *AV-Game I* (Iwai 1986) and *II* (Iwai 1987), the artworks that predated *Otocky*. This further step can be enscribed within the larger field of game archeology, "an increasingly popular trend among studies of game history […] most generally focused on the pre- and protohistories of games, which can also lead to a tendency to underline […] experimental aspects of contemporary game cultures" (Suominen 2017, 555). The experimental nature of *Otocky* is arguably not indigenous to digital game culture, but was rather directly imported by Toshio Iwai from the cultural context of media art. As noted by Huhtamo, "electronic games did not appear out of nowhere; they have a cultural background that needs to be excavated" (2015, 4): in this case, Iwai has connected music game and experimentalism, creating a rarely acknowledged precedent for music games' history and evolution.

References

Aarseth, Espen, and Gordon Calleja. 2015. "The word game: The ontology of an undefinable object." *Foundations of Digital Games Conference.* Pacific Grove, CA.

[3] This Famicom Disk System game was notably packaged with a music keyboard and included original tracks from popular Konami games, predating contemporary musical ludo mix practices (Oliva 2021).

Aarseth, Espen. 1997. *Cybertext.* JHU Press.
Altice, Nathan. 2015. *I Am Error: The Nintendo Family Computer / Entertainment System Platform.* MIT Press.
Bailey, Derek. 1993. *Improvisation: Its Nature and Practice in Music.* Da Capo Press.
Beer, David. 2010. "Mobile Music, Coded Objects and Everyday Spaces ." *Mobilities* 469–484.
Borgo, David. 2007. "Musicking on the Shores of Multiplicity and Complexity." *Parallax* 13 (4): 92–107.
Borgo, David. 2013. "Beyond Performance: Transmusicking in Cyberspace ." In *Taking It to the Bridge: Music as Performance*, edited by Nicholas Cook and Richard Pettengil, 319–348. University of Michigan Press.
Borgo, David. 2022. *Sync or Swarm: Improvising Music in a Complex Age (Revised Edition).* New York: Bloomsbury Academic.
Chion, Michel. 1994. *Audio-Visual: Sound on Screen.* Columbia University Press.
Collins, Karen. 2007. "An Introduction to The Participatory and Non-Linear Aspects of Video Games Audio." In *Essays on Sound and Vision*, by John Richardson and Stan Hawkins, 263–298. Helsinki University Press.
Collins, Karen. 2009. "An Introduction to Procedural Generated Music in Games." *Contemporary Music Review* (Taylor & Francis) 28 (1): 5–15.
Collins, Karen. 2013. *Playing With Sound: A Theory of Interacting with Sound and Music in Video Games.* MIT Press.
Desain, Peter, and Henkjan Honing. 1989. "The Quantization of Musical Time: A Connectionist Approach." *Computer Music Journal* 13 (3): 56–66.
Eastgate Systems. 1987. "Storyspace."
Eco, Umberto. 1989. *The Open Work.* Harvard University Press.
Encyclopaedia Britannica. 2007. *Musical expression.* Accessed Oct. 27, 2022. https://www.britannica.com/art/musical-expression.
Herber, Norbert. 2008. "The composition-instrument: Emergence, improvisation and interaction in games and new media." In *From Pac-Man to pop music: Interactive audio in games and new media*, by Karen Collins, 103–125. Aldershot: Ashgate.
Huhtamo, Erkki. 2015. "Slots of Fun, Slots of Trouble An Archaeology of Arcade Gaming." In *Handbook of Computer Games Studies*, by Joost Raessens and Jeffrey Goldstein, 3–22. Cambridge, MA: MIT Press.
Huhtamo, Erkki. 2016. "Art in the Rear-View Mirror." In *A Companion to Digital Art*, edited by Christiane Paul, 69–102. John Wiley & Sons Inc.
Iwai, Toshio. 1986. *AV-Game I.*
Iwai, Toshio. 1987. *AV-Game II.*
Iwai, Toshio. 1994. "Toshio Iwai by Toshio Iwai." In *Toshio Iwai*, edited by Päivi Talasmaa, 20–29. ZKM | Zentrum für Kunst und Medientechnologie Karlsruhe ; Galleria OTSO Espoo.
Iwai, Toshio. 2008–2014. *Hyakkai-date no ie.* Kaisei-sha Publishing Co., Ltd.
Juul, Jesper. 2019. *Handmade Pixels: Independent Video Games and the Quest for Authenticity.* MIT Press.
Kassabian, Anahid, and Freya Jarman. 2016. "Game and Play in Music Video Games." In *Ludomusicology: Approaches to Video Game Music*, by Michiel Kamp, Tim Summers and Mark Sweeney. Sheffield: Equinox Publishing.
Klevjer, Rune. 2002. "In Defense of Cutscenes." *Proceedings of Computer Games and Digital Cultures Conference.* Tampere: DiGRA. 191–202.
Konami. 1985. "Gradius." Konami.
Konami. 1987. "Doremikko." Konami.
Landy, Leigh. 2007. *Understanding the Art of Sound Organization.* MIT Press.
Lewis, Eric. 2019. *Intents and Purposes: Philosophy and the Aesthetics of Improvisation.* Ann Arbor: University of Michigan Press.
Magnus, Cristyn. 2007. "Aesthetics, score generation, and sonification in a game piece." *roceedings of the International Computer Music Conference.* San Francisco: International Computer Music Association. 262–265.
Maxis. 1996. "SimTunes." Maxis.
McMillan, Luke. 2013. *The Origin of The 'Shmup' Genre: A Historical Study.* Accessed Oct. 27, 2022. https://www.gamedeveloper.com/design/the-origin-of-the-shmup-genre-a-historical-study#_ftn7.
Morioka, Yoshimoto. 1995. "Between Magic and the Algorithmic Image." Edited by Marc de Guerre and Kathleen Pirrie Adams. *PUBLIC* (11): 45–50.
Moseley, Roger, and Aya Saiki. 2014. "Nintendo's Art of Musical Play." In *Music in Video Games*, edited by K.J. Donnelly, William Gibbons and Neil Lerner, 51–76. Routledge.
Moseley, Roger. 2016. *Keys to Play: Music as a Ludic Medium from Apollo to Nintendo.* University of California Press .
Nguyen, C. Thi. 2022. "Creattivity and Improvisation in Games." In *The Routledge Handbook of Creativity and Improvisation in the Arts*, by Alessandro Bertinetto and Marcello Ruta, 685–698. New York, NY: Routledge.
Nintendo. 2005. "Electroplankton." Nintendo.
NTT InterCommunication Center [ICC]. 2011. *IWAI Toshio profile.* Accessed Aug. 27, 2022. http://www.nttticc.or.jp/en/archive/participants/iwai-toshio/.
Oliva, Costantino, and Ari Poutiainen. 2022. "Otogarden: Exploring Musical Improvisation in Video Games." *Journal of Sound and Music in Games* (University of California) 3 (2–3): 28–58.
Oliva, Costantino. 2021. "The Musical Ludo Mix of Taiko no Tatsujin." *Transactions of the Digital Games Research Association* (DiGRA) 5 (2): 131–160
Oliva, Costantino. 2019. *Musicking with Digital Games [PhD dissertation].* Msida, Malta: University of Malta.
Oliva, Costantino. 2017. "On the ontological status of musical actions in digital games." *The Philosophy of*

Computer Games Conference. Kraków.
Pichlmair, Martin, and Fares Kayali. 2007. "Levels of Sound: On the Principles of Interactivity in Music Video Games." *Situated Play, Proceedings of DiGRA 2007 Conference* . Tokyo: DiGRA. 424–430.
Pressing, Jeff. 1998. "Psychological Contraints on Improvisational Expertise and Communication." In *In the Course of Performance*, by Bruno Nettl, 47–69. Chicago: University of Chicago Press.
Rautiainen-Keskustalo, Tarja. 2021. "Embodiment through digital intangibility: Infrastructures of musicking." *Journal of New Music Research* 1–8.
Riley, Adam. 2006. "C3 Exclusive Interview | Toshio Iwai on Nintendo, Wii...& Musical Fish!" *Cubed3.com.* Accessed Jun. 20, 2018. http://www.cubed3.com/news/5724/1/c3-exclusive-interview-toshio-iwai-on-nintendo-wiiand-musical-fish.html.
Rolling Stone. 2011. *The Top 20 Music Games of All Time.* Accessed Sep. 7, 2022. https://www.rollingstone.com/culture/culture-lists/the-top-20-music-games-of-all-time-22696/1987-otocky-18176/.
SEDIC. 1987. "Otocky." ASCII Corporation.
SEDIC. 1987. "Otocky Game Manual." ASCII Corporation."
Shmuplation. 2019. *Machiguchi Hiroyasu Gradius Interviews.* Accessed Oct. 27, 2022. https://web.archive.org/web/20190729084921/http://shmuplations.com/gradius-machiguchi/.
Small, Christopher. 1998. *Musicking: the Meaning of Performing and Listening.* Wesleyan University Press.
StrategyWiki. 2009. *Otocky/Music Maker Mode.* Accessed Oct. 27, 2022. https://strategywiki.org/wiki/Otocky/Music_Maker_Mode.
Studley, Thomas, Jon Drummond, Nathan Scott, and Keith Nesbitt. 2022. "Can Competitive Digital Games Support Real-Time Music Creation?" *Journal of Sound and Music in Games* 1–35.
Summers, Tim. 2020. *The legend of Zelda: Ocarina of Time - A Game Music Companion.* Bristol: Intellect.
Suominen, Jakko. 2017. "How to Present the History of Digital Games: Enthusiast, Emancipatory, Genealogical, and Pathological Approaches." *Games and Culture* (Sage Publishing) 12 (6): 544–562.
Williams Electronics. 1981. "Defender." Williams Electronics/Taito.