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A Spectral Pop Star Takes the Stage: Hatsune Miku and the Materialization of the Ephemeral in Contemporary *Otaku* Culture

Abstract

The music-software avatar Hatsune Miku is often hailed as an icon of participatory culture. This paper, however, seeks to examine her phenomenal status from a different angle: that it represents the latest manifestation of contemporary *otaku* activity. In this activity, the virtual, ephemeral character crosses the boundary of the screen, emerging into the world of sense perception. Hatsune Miku's media representations, along with other *otaku* practices, represent attempts to materialize the ephemeral in everyday life.

Referencing Anne Friedberg's *The Virtual Window*, this paper argues that Miku's various media manifestations pose a new challenge for both screen studies and stardom studies: how to theorize an industrial environment in which producers and fans collaborate to try and move animated characters off the screen and into the physical world of the viewer. In this environment, the animated character can be worshipped not merely in the darkened hall of the theater or the television-equipped living room, but in any and all of the spaces in which fans live their lives.

On March 9, 2010, a most unusual concert was held at the Zepp nightclub on the island of Odaiba in Tokyo Bay.¹ Hatsune Miku, the teal-haired, anime-styled mascot for a vocal-synthesis program developed by Crypton Future Media (using Yamaha Corporation's Vocaloid 2 engine) "performed" live on stage before a crowd of five thousand people. Backed by a full band of living, human musicians and given visible form by a team of 3D modelers, animators, and motion-capture artists,² Miku cheerily worked through a set of songs by producers both amateur and professional. With a candy-colored CG character appearing to occupy the same physical space as her human stage-mates, this novel *mise-en-scène* fueled a storm of media coverage in outlets around the world, as well as follow-up concerts both within Japan and internationally, in Singapore, Los Angeles, and Düsseldorf.

The Vocaloid phenomenon now commands a fair amount of academic attention, particularly as a case study in participatory culture. Using Crypton's Vocaloid sample packs, amateur musicians composed most of the popular Vocaloid

songs, paired them with fan-created music videos, and released them to the world through video-streaming sites like YouTube and Nico Nico Douga. The concerts themselves, though, have yet to be theorized in any meaningful way. In the following pages, this paper will attempt to do so, arguing that these concerts, while striking, are far from exceptional. Rather, they are merely particularly potent manifestations of a longstanding tension within *otaku* fan culture,³ a tension between the viewer's world of the here-and-now and the fictional character's world of the screen. Sega's Hatsune Miku concerts throw that tension into crisis, reflecting some of the myriad ways in which *otaku* seek to materialize ephemeral characters, lifting them outside of the screen and into the world of tactile reality, placing the material and the ephemeral on equal footing.

Friedberg and the Screen

One of the most comprehensive accounts of thinking about the screen can be found in Anne Friedberg's *The Virtual Window*. For Friedberg,

the screen functions, among other things, as a boundary separating the world of sense perception from the world of fiction:

[L]ike the frame of the architectural window and the frame of the painting, the frame of the moving-image screen marks a separation—an ‘ontological cut’—between the material surface of the wall and the view contained within its aperture. ... But the frame also separates the *materiality* of spectatorial space from the *virtual immateriality* of spaces seen within its boundaries.⁴

The boundary-defining properties of the screen frame mirror one of the fundamental concepts involved in theorizing *otaku* activity. Conventionally, *otaku* have been thought of as individuals unable to distinguish between fantasy and reality. Summarizing this view, psychoanalyst Tamaki Saitou writes: “[*o*]taku are immature human beings who have grown up without being able to let go of infantile transitional objects such as anime and monsters. They avoid contact with reality for fear that it will harm them and instead take refuge in a world of fiction.”⁵ This “psychopathology of the *otaku*,”⁶ he argues, is largely a myth, for in his experience as a practicing psychiatrist and researcher of *otaku*, “there are few [other] individuals more strict about that distinction [between fantasy and reality].”⁷

It is, at first, tempting to think that some of this might be due to the screen’s boundary-defining nature. As the “experts, connoisseurs, enthusiasts, and hackers of media culture”⁸ identified by Mizuko Ito, *otaku* certainly inhabit a world surrounded by screens. Friedberg, for her part, seems to anticipate this conclusion, while also complicating it; citing A.M. Homes’s traumatic account of viewing the 9/11 attacks in person, she notes that “Homes was unprotected by the frame or by the screen.”⁹

The spatial division (inside/outside, here/elsewhere) delimited by the screen initially appears to guarantee aesthetic distance. One viewing the 9/11 attacks on her television set would thus be insulated, at least to a certain degree, from the raw horror of seeing them unfold in person. Within the

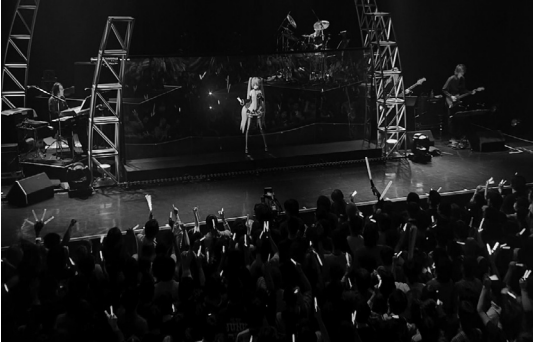
screen’s boundaries lies the realm of fiction, a realm which invites questioning of the truth-claims put forth by imagery. Yet this spatial distinction holds the potential for a form of cognitive dissonance in which “many wished that the images of 9/11 were only a movie or television special effect.”¹⁰ While the screen holds the potential to protect, it also holds the potential to destabilize or even harm, as repeated exposure to the fictional conventions contained within the screen carries with it the risk of the viewer losing the ability to discern where, exactly, the boundary lies. Saitou’s *otaku*, then, may well be psychologically sound not because of the presence of the screen, but despite it.

Enclosing the Cinema of Attractions

Certainly, many *otaku*-oriented commercial works actively attempt to tear down the boundary separating the viewer from fiction. They delight in employing formal techniques of direct address. As Tom Gunning describes, such techniques—whose effect is summarized as “presenting a series of views to an audience”¹¹—foreground their visibility, their “willing[ness] to rupture a self-enclosed fictional world for a chance to solicit



Hatsune Miku, the virtual idol, gazes back at the camera during filming of “her” March 9, 2010, concert at Zepp Tokyo: *Miku no Nichi Kanshasai 39’s Giving Day*



Screengrab from the *39's Giving Day* concert Blu-Ray, showcasing the stage setup used, including the transparent screen.

the attention of the spectator.”¹² According to Gunning, this tendency reached its peak during the years of 1906-1907, which he christens the time of the “Cinema of Attractions”; after 1907, narrative rose to become the dominant stylistic force in cinema, in the process turning direct address into a “taboo.”¹³ But rather than eradicate the cinema of attractions entirely, the cinema of narrative subsumed spectacle, repurposing it as a means to add vibrancy to a story.

The allure of spectacle never faded, but the cinema of narrative fundamentally altered the position of spectacle with respect to the viewer and to the boundary posed by the screen. Friedberg expands on this historiography, arguing that as the cinema of attractions diminished, audiences instead found themselves facing the rise of the “theaters of attractions.”¹⁴ As a focus on narrative homeostasis displaced spectacle within the world of fiction, the spectacular crossed the boundary of the screen to situate itself within the material world of sense perception—within the very walls, floors, and ceilings of the movie theater. It thus became a defining design characteristic of the grand movie palaces of the 1920s, those “architectural hyperboles designed for the spectacle of pure visibility.”¹⁵ And while spectacle arguably moved from the space of the theater back into the filmic diegesis during the post-*Star Wars* age,¹⁶ Lev Manovich contends that this is an altogether different phenomenon. The omnipresence of special effects in contemporary cinema is at least partially the result of the increased adoption of post-production compositing techniques. Animation’s logic of assembly thus subsumes the recorded,

photographic cinema. “Live-action footage is now only raw material to be manipulated by hand,”¹⁷ and all films are potentially animations.

This merging of cinema and animation finds its match in the behavior of *otaku*. Tamaki Saitou cites one of the characteristics of *otaku* activity as being the ability “to find reality (*riariti*) equally in both fiction and reality (*genjitsu*).”¹⁸ Rather than confusing reality and fiction, as some critics argue, *otaku* instead grant equal priority to each; neither is privileged over the other. In addition to echoing Manovich’s contention that live-action material is no longer privileged over illustrated or computer-rendered material in the post-production booth, this statement of Saitou’s begs the question of whether contemporary filmgoers, having accepted this new logic of compositing, thus become like *otaku*, at least temporarily, when watching a film. Animation thus appears to compel not only a restructuring of cinematic form, but also of the viewer’s own position with respect to the spectacular worlds and events set forth.

Points of View, Points of Immersion

Spectacle, indeed, has long enjoyed a privileged relationship with animation. Whether through some fundamental characteristic of the medium, or merely a stylistic tendency, generations of animators relished in bringing patently fantastic visions to the screen. Some early animators—Windsor McCay and the Fleischer brothers, for example—contextualized their works by showcasing the creative process as part of an animated short film, turning the animator himself into a source of spectacle. Often, this sense of spectacle centered around the very nature of animation as a consecutive sequence of drawn images, given motion through the power of the film projector. At times, the spectacular power of animation lay in the simple illusion of moving caricature, at others that power was more technical in its manifestations. Frank Thomas and Ollie Johnston note several types of animation, including cycles and “cross-overs” (duplicated action) that astonished because of their evident sophistication: of the cross-over, they note that audiences were “enthralled and could not understand how we could get all the figures to act exactly the same.”¹⁹

Though Thomas and Johnston betray some of the condescension towards early spectators that Gunning identifies in “An Aesthetic of Astonishment,”²⁰ they nevertheless suggest that animation, unlike live action, never fully subsumed spectacle in the service of narrative. There remained a prominent place for spectacle in the medium of animation, if not for direct address. While the move to a theatrical tableaux aesthetic lent more of a performative aspect to animation (in contrast to live-action cinema, which seemed to strive for a fly-on-the-wall approach to framing subject matter), it also erected a more or less solid fourth wall, keeping spectacular action confined to the diegetic world.

Anime and *otaku*-oriented works, however, go well beyond the territory of mere spectacle, venturing into the realms of direct address. One of the most distinctive aspects of the contemporary anime aesthetic is the frequency with which characters stare out at the viewer. Indeed, as a phenomenon it is nearly ubiquitous. Characters on product boxes, magazine covers, online banner ads, posters, and even the infamous *dakimakura* (body pillow) covers are consistently drawn so as to appear to meet the viewer’s gaze. Within the realm of anime works, this style surfaces in a willingness to make frequent use of POV shots. In many cases, these function as elsewhere in cinema: they allow the viewer to see temporarily through the eyes of a character.

Some works go much further and deliberately make use of the POV shot as a proxy for directly addressing the viewer. Episode 1 of the *Idolm@ster* TV series (2011–2012),²¹ for example, unfolds almost entirely through the first person. The *mise-en-scène*, and narrative justification for this intensive use of first-person perspective, is that of a documentary feature introducing the twelve young idols employed by 765 Productions.²² Yet at the end of the episode, we learn that the cameraman is, in fact, the studio’s new producer, hired to turn the ragtag band of idols into national celebrities. This development plays into a complex bit of intertext. The original *Idolm@ster* video games (arcade, 2005; Microsoft Xbox 360, 2007) largely assume the first-person perspective that predominates in *otaku*-targeted *bishōjo* (“pretty girl”) titles, but with a twist: at the start of the game, the player is asked

to name the producer-protagonist who serves as the player’s avatar.²³ The producer’s personality, as in many *bishōjo* games, is largely determined through the player’s choices at branching dialogue events.

The use of these techniques has not only persisted within *otaku*-oriented media; it has intensified. More recent *bishōjo* games have adopted ever more sophisticated strategies to immerse the player within the game’s fiction. Konami’s first-person dating simulator *Love Plus* (Nintendo DS, 2009) allows players to type in their own name, as in *The Idolm@ster*. Here, however, the game’s characters—instead of using a generic term like “producer” in spoken dialogue—actually say the player’s chosen name aloud, due to the developers’ decision to record individual Japanese phonemes for each voice



Eye-catch images from *Kiddy Grade*, illustrated by Akio Watanabe and showcasing the aesthetic of direct address in *bishōjo* anime.

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actress.²⁴ Taken in aggregate, these elements point to a strategy in which the game encourages its player to view the characters as if they were directly addressing him or her, rather than the diegetic protagonist.

Screening the Gaze

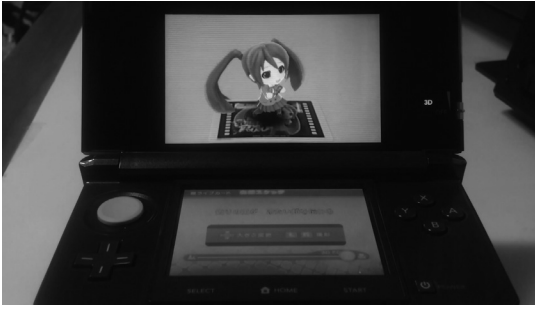
The intensity and frequency with which *bishōjo* characters return the viewer's gaze stands in marked contrast to the dynamic outlined in Laura Mulvey's "Visual Pleasure and Narrative Cinema," where female characters in the "classical" Hollywood cinema exist chiefly as objects to-be-gazed-at by a domineering, cis-male, and heterosexual viewer. Yet Scott Bukatman argues that Mulvey, limited by an insistence on "the power of narrative,"²⁵ produces a theory that is ultimately unable to grapple fully with the "disruptive power"²⁶ of cinematic spectacle. Classical Hollywood cinema, according to Bukatman, strove to contain and harness this destabilizing potential a mission doomed to be forever unfulfilled.²⁷

Equally convinced of the power of narrative, Hiroki Azuma mourns the passing of the grand narratives of 1970s science-fiction anime, and with them what he sees as the stabilizing logic of modernity.²⁸ Un beholden to narrative concerns, character-driven *bishōjo* anime never really attempts to contain spectacle, and in so doing unleashes a disruptive power of its own. Characters, as if competing for the attention of the viewer, strain the frame to the point of bursting, as in a pair of "eyecatch" images²⁹ created by illustrator Akio Watanabe for the TV series *Kiddy Grade* (2001–2002). At times, the *bishōjo* not only returns the viewer/player's gaze, but makes actual demands, however minor. Konami's *Love Plus* games use the Nintendo DS's system clock to synchronize the games' events with real-world time; the player who repeatedly misses appointments with a chosen virtual girlfriend may find that the "relationship" has irreparably deteriorated *in absentia*.

Yet there are limits to this process. The *bishōjo* character, even bolstered with contemporary game developers' most inventive applications of technology, ultimately finds herself bounded by the frame of the



Sample photograph from figure.fm, an online site run by blogger Danny Choo where *otaku* can post images of their dolls and figurines. Image by user ARAEL, depicting his doll Yuki.



Screengrab from a video by YouTube user lolijin, demonstrating the augmented reality features of *Hatsune Miku and Future Stars: Project Mirai*.

screen. Even in the best of cases, when she reaches out into the real world—as in the in-character emails sent to players of *New Love Plus*—it is through trace communications, faint whispers of an ephemeral presence. More commonly, the character undergoes a sort of death. The doll or figurine stares out blankly from the collector’s shelf. The printed image on the poster or the *dakimakura* cover remains eternally frozen, holding one carefully-crafted expression. Citing Deleuze, Friedberg notes the “closed system” of the screen;³⁰ beyond the frame lies only the elsewhere, the out-of-bounds. Animation confronts a boundary even more absolute than this; while careful draftsmanship may, at times, create the illusion of characters extending beyond the bounds of the frame, the area outside may never have been drawn at all. Like an organism finely adapted to its environment, the anime character can only survive within an extremely limited set of conditions: only within the bounds of the frame, and preferably under conditions of motion and sound.

Thomas Lamarre writes that the contemporary *otaku*-oriented media mix has given rise to “soulful bodies”: characters imbued with a sense of life and internal consistency allowing them to move seamlessly from one medium to the next.³¹ For these bodies, “movements of heart, soul, and mind are inscribed onto the surface of the character, flickering over its contours or winding restlessly through its interstices.”³² Soulful design grants the character life, and the ability to maintain that life even under conditions of restricted movement, as in techniques of

limited animation, but it can only go so far. It is perhaps telling that some *otaku*, having spent potentially hundreds of dollars on vinyl figurines of their favorite characters, or even thousands on custom-made ball-jointed dolls, busy themselves with remediating these characters through staged photography. A carefully-composed photograph, bounded by its frame, provides focused context which the real world cannot—context which, ultimately, serves as an ecosystem in which soulful bodies can truly take root.

Conclusion: Hatsune Miku, Stargazer

Unsurprisingly, the *otaku* media environment boasts screens in abundance. Researchers and merchandisers alike have proven eager to devise new methods to interact with characters using screens, and new ways to monetize existing methods. Sega’s *Hatsune Miku: Project DIVA* game franchise (Sony PSP, 2009, 2010)—which spawned the *39’s Giving Day* concert, and which allow players to tap along to popular Miku songs while the teal-haired idol performs a whimsically-themed song and dance routine—recently added a new installment which breaks new ground in both areas.

Hatsune Miku and Future Stars: Project Mirai (Nintendo 3DS, 2011) combines the rhythm-centric gameplay of the previous *Project DIVA* titles with character models adapted from Good Smile Company’s endearingly stubby Nendoroid figure line. Players choose either to play songs in the traditional *Project DIVA* mode (with volumetric, computer-rendered characters performing within a volumetric, computer-rendered environment) or exploit the 3DS’s augmented reality technology to have Miku and friends perform a concert in the player’s own living room though only visible when framed by the 3DS’s camera display.³³

Similarly, the March 9, 2010, concert achieved its boundary-shattering *mise-en-scène* through the inventive application of screen technology. This was not, in fact, Miku’s first time on stage. Previous concerts, such as Miku’s first performance at Animelo Summer Live 2009 Re:Bridge, and her subsequent appearance at MikuFES ’09, highlighted technological limitations, including screens that were only semi-transparent (or not transparent at all, in the case of the Animelo

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concert) and projection systems too dim to make Miku consistently visible under the stage lights (as in the case of MikuFES '09). By contrast, the 39's *Giving Day* concert (and its follow-up in Los Angeles on July 2, 2011) made use of Panasonic dual-projector stacks for extra brightness, and a highly-reflective DILAD transparent screen film from the Kimoto corporation.³⁴ But even this technology is not infallible: turn on the room lights, and the image disappears, returning the character to the ephemeral realm from whence she emerged.

The domestic placement of the television set, according to Friedberg, encouraged people to incorporate it into their homes.³⁵ *Otaku*, having fully incorporated screens within their daily existence, now appear to seek a world without screens though not without the characters who

currently exist within the boundaries of the frame. As they grant equal standing to reality and fiction in their approach to the everyday, so too do they seem to desire a media environment in which the ephemeral and the material exist on equal terms, and where characters can not only be seen and heard, but touched,³⁶ and experienced as independently of the screen as possible. The perspectival logic of the screen—here/elsewhere, inside/outside—no longer seems convincing at a time when characters have successfully broken the grip of the cinematic narrative which thrived under such divisions. And certainly not when a singer with an animated body, a synthesized voice, and a spectral presence can command the attention, awe, and love of thousands of fans who can believe, even for a minute, that a teal-haired angel can occupy the same stage commanded by idols of the human persuasion.

Forrest Greenwood recently earned his M.A. in Critical Studies at USC's School of Cinematic Arts. His research interests center on the tension between reality and fantasy in media theories and works, with specific emphasis on how this tension manifests within animation, fan culture, interactive media, and Japanese cinema. He currently works as a photographer and graphic designer for WDIO 10/13 in Duluth, MN, and as an adjunct English instructor at The College of St. Scholastica.

End Notes

1 As an artificial island built on a landfill, Odaiba is perhaps unintentionally fitting as the site for such an experiment in constructed reality.

2 Video-game developer/publisher Sega furnished the concert's animation component, producing it partly as a marketing stunt for the then-latest installment in a series of rhythm games featuring Crypton's mascot characters.

3 By "*otaku* fan culture" I refer not only to the fandom expressed by the group of Japanese media consumers commonly referred to as *otaku*, but also to that of international audiences with similar tastes. For more on this distinction, as well as an elaboration of underlying themes, I highly recommend Mizuko Ito's introduction to *Fandom Unbound: Otaku Culture in a Connected World*, eds. Mizuko Ito, Daisuke Okabe, and Izumi Tsuji (New Haven, CT: Yale University Press, 2012).

4 Anne Friedberg, *The Virtual Window: From Alberti to Microsoft* (Cambridge, MA: MIT Press, 2005), 5-6.

5 Tamaki Saitou, *Beautiful Fighting Girl*, trans. J. Keith Vincent and Dawn Lawson (Minneapolis: University of Minnesota Press, 2011), 9.

6 Ibid.

7 Tamaki Saitou, "Otaku Sexuality," trans. Christopher Bolton, in *Robot Ghosts and Wired Dreams: Japanese Science Fiction from Origins to Anime*, eds. Christopher Bolton, Istvan Csicsery-Ronay Jr., and Takayuki Tatsumi (Minneapolis, MN: University of Minnesota Press, 2007), 227.

8 Mizuko Ito, "The Gender Dynamics of the Japanese Media Mix," in *Beyond Barbie and Mortal Kombat: New Perspectives on Gender, Games and Computing*, eds. Yasmin Kafal et al. (Cambridge, MA: MIT Press, 2008), 101.

9 Friedberg, 246.

10 Ibid.

11 Tom Gunning, "The Cinema of Attraction[s]: Early Film, Its Spectator and the Avant-Garde," in *The Cinema of Attractions Reloaded*, ed. Wanda Strauven (Amsterdam: Amsterdam University Press, 2006), 382.

12 Ibid.

13 Ibid., 386.

14 Friedberg, 167. Italics in original.

15 Ibid.

16 It is perhaps worth noting in this regard that the rise of the contemporary special-effects film roughly parallels the rise of the corporate multiplex.

17 Lev Manovich, *The Language of New Media* (Cambridge, MA: MIT Press, 2001), 302.

18 Saitou, *Beautiful Fighting Girl*, 24.

19 Frank Thomas and Ollie Johnston, *The Illusion of Life: Disney Animation* (New York: Disney Editions, 1981), 42–43.

20 Tom Gunning, “An Aesthetic of Astonishment: Early Film and the (In)Credulous Spectator,” in *Film Theory and Criticism*, 7th ed., eds. Leo Braudy and Marshall Cohen (New York: Oxford University Press, 2009), 737.

21 Based on Namco Bandai’s Xbox 360 and Playstation 3 video-game franchise of the same name.

22 A fictional company whose name serves as a particularly groan-worthy bit of fourth-wall-breaking punnery; spelled 765, it is pronounced “Na-mu-co.” See the note above.

23 The game automatically appends “-P” (ostensibly for “producer”) to the player’s chosen name; this has also become a common naming convention among creators of Vocaloid songs and videos, though it is unclear at this time whether a causal connection exists.

24 The second sequel, *New Love Plus* (Nintendo 3DS, 2011), introduces two novel elements. Players are invited to enter their email address during the setup process, allowing for the receipt of customized emails ostensibly “written” by the fictional girlfriend. Additionally, the game now sports a “Boyfriend Lock” feature which uses the 3DS’ front-facing camera to disable the spoken-name feature and prevent further progress if anyone other than the registered user attempts to play the game.

25 Scott Bukatman, “Spectacle, Attractions and Visual Pleasure,” in *The Cinema of Attractions Reloaded*, ed. Wanda Strauven (Amsterdam: Amsterdam University Press, 2006), 75.

26 Ibid., 76.

27 Ibid., 80.

28 Hiroki Azuma, *Otaku: Japan’s Database Animals*, trans. Jonathan E. Abel and Shion Kono (Minneapolis, MN: University of Minnesota Press, 2009), 39.

29 “Segments of anime or still shots—usually timed to music and lasting only seconds—appearing after a commercial break in the middle of a televised anime [episode]. The purpose is to draw viewers back to the show.” Patrick W. Galbraith, *The Otaku Encyclopedia: An Insider’s Guide to the Subculture of Cool Japan* (Tokyo: Kodansha, 2009), 68. To add to this, some series—such as *Kiddy Grade*—use still images in eye-catch segments to feature illustrations by guest artists, often individuals known for their work in other commercial *otaku*-oriented media, or for their *dōjinshi* (fan-produced derivative works), thus providing an additional commercial outlet for participatory culture.

30 Friedberg, 241.

31 Thomas Lamarre, *The Anime Machine: A Media Theory of Animation* (Minneapolis: University of Minnesota Press, 2009), 201.

32 Ibid., 312.

33 Far from confining this experience to one title or one platform, Sega appears poised to turn this into an emergent genre. Hatsune Miku: Project DIVA F, due for release on Sony’s PlayStation Vita in August 2012, sports a similar augmented-reality mode, but with character models more similar to those in the concerts. The game’s initial advertising campaign, curiously, takes pains to highlight the inclusion of this feature.

34 Anime News Network, “News: Hatsune Miku’s Anime Expo Concert Books 3,500 Seats (Updated),” Anime News Network, accessed March 31, 2012, <http://www.animenewsnetwork.com/news/2011-06-13/hatsune-miku-anime-expo-concert-books-3500-seats>. Kimoto Corporation designed these films to be applied to a glass surface. When not employed for novelty concerts, they often enable the use of video in storefront displays, per Kimoto’s website (www.diladscreens.com).

35 Friedberg, 233.

36 DigInfo TV, “Touchable 3D Character Projected Into a Real Environment,” DigInfo TV, accessed March 28, 2012, <http://www.diginfo.tv/v/11-0184-r-en.php>. Although the *otaku*-oriented culture industry has yet to find ways to commercialize haptic interface technology (beyond figurines whose paint changes color with the application of heat, such as from an owner’s hand), a group of researchers from Keio University recently unveiled an integrated controller/display system which seems uncannily prescient. RePro3D combines a transparent multi-point 3D screen (producing a 3D effect visible from any angle, without special glasses) with a motorized sensor that clips onto the user’s finger. The sensor both relays finger position to the computer and vibrates upon receipt of certain signals—thus not only allowing the user to “touch” an otherwise ephemeral character, but also providing data necessary for the character to respond to the touch.