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Aspects of synchrony in animation

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Abstract

This article examines aspects of how sound (especially music) integrates with animated images and, especially, how synchrony between sound and image offers the viewer focal points of attention within the animation. It examines synchronic gestures in two animations – one abstract, the other representational – and compares the use of synchronous sound in both. It places these two works in the context of animation generally and offers reflections on aspects of the relationship between sound and image in animated film.

Links to the audio and video material described are offered in the body of the text.

Keywords

sound
music
animation
synchrony
narrative support

Synchrony in narrative cinema

Narrative cinema's perennial concern has been with promoting an audience's 'suspension of disbelief'.[1] This rather crude term has been used generally as a shorthand for the process by which audiences become involved with moving images' content by suspending certain critical faculties: 'to propel the spectator to lose himself in an exclusive and central point of view: the plot unfolding' (Chion 2003: 28).[2]

Perhaps a more appropriate term might now be coined as *the suspension of criticality.*

The assumption that somehow an audience would accept readily the 'reality' of two-dimensional moving images is perhaps overly simplistic. Not many in the audience (even at the time of Lumiére) would actually *believe* that a real (but monochrome) train was about to crush them. However, a *suspension of criticality* allowed for sufficient numbers of early viewers to engage temporarily in the fiction that Pearl White was in real danger from a speeding locomotive. The images were a sufficiently powerful metaphor to evoke a response in the audience. Live music, acting on subliminal senses, reinforced the emotional tenor of the images, aiding this process considerably.

At around the same time as truly narrative cinema emerged, exhibitors often employed (more or less) synchronous sound as a significant means of engaging the audience with a film's narrative (Altman 2005). Very early in the silent era, attempts were made to provide near-synchronous music and sound effects to accompany films, to be performed live with the images. Rudimentary 'cue sheets' were provided to cinemas by distributors, encouraging this practice. For use in larger cinemas, full orchestral scores were composed, with details provided as to the matching of musical effects with movement on screen.[3] Musicians were also often called upon

1. This phrase was invented by Coleridge in 1817 in his *Biographia Literaria*. He suggested that the suspension of disbelief 'constitutes poetic faith'.
2. CHION, Michel (Translated Antonio D'Alfonso) *The Films of Jaques Tati*, Guernica, Toronto, 2003, p28.
3. Two separate scores by Nicolai Kryukov and Edmund Meisel were composed for Eisenstein's *Battleship Potemkin* (1925) one each for the Berlin and Moscow premieres.

to improvise horses' hooves with coconut shells, pratfalls with Sewanee whistles, and storms through wind machines. From the very beginning, sound was used as a way of *authenticating* images (Wells 1998).[4] One might also posit the notion that the sounds produced as effects authenticated the 'reality' of the images, while the synchronous music linked what the audience was seeing to an emotional reinforcement of the action.

From those beginnings, sound synchronization continues to be used as one of the elements through which audiences make meaning from film. The extent of reliance on synchronous gestures as narrative support is dependant upon historical, stylistic and industrial processes. However, in narrative film, it may be safe to suggest that the reliance on sonic synchrony is determined by the level of meaning explicit in the images themselves. For example, in Fritz Lang's *Testament of Dr. Mabuse* (1933), the sync sound of a man as he runs down a street is absent; his feet fall silently on the pavement. Neither is there any atmospheric sound of street noises, neither traffic nor general urban ambience. It might be said that the visual representation of those actions, especially to an audience recently accustomed to 'silent' images, did not require the support of Foley sounds. Later, when a cornice of a building crashes at the same man's feet, that sound is exaggerated by the absence of others, heightening its impact. Throughout the film, Lang carefully marshals his sounds, post-syncing onto the film only those sounds that are necessary for meaning and/or emotive significance. It could reasonably be argued that the technology for recording and dubbing sound was so primitive at this time that all but the most flagrant sound effects and dialogue would be engulfed by the incessant hiss of the optical track.[5]

It could also be argued that film-makers who had recently emerged from a world of music-dominated asynchronous projection were much more mindful of the power of individual sounds to carry meaning. In this new environment, the notion of continuous synchronous non-essential sound might be seen as a distraction. Such an approach might be inferred through examination of works such as Hitchcock's *Blackmail* (1929) and Lang's *M* (1931).

Another construct: we see a man who moves into full frame, his footsteps follow appropriately on the wooden floor; he speaks, and his lips move in time with the words; the music swells and as we cut to a woman on a settee, who hears his words; we can see start of a small tear in her eye just before she pulls the trigger. We accept the scene and the narrative metaphors it contains. Synchronous sound and supportive music allow us to bypass our critical faculties, ignoring the jump cuts, the extreme close-ups, and the impracticability of having an orchestra in the same room as the action. However, if the lip sync is imperfect (or badly dubbed), if the music is inappropriate or overly obtrusive, or if the gunshot precedes (or long follows) the pulling of the trigger, we revert to critical mode, and our attention focuses on the surface of the film and is thereby drawn away from its content.[6] Synchronous sound offers to images literal and emotional verisimilitude. Nowadays, most effects, music and atmospheres are added in post-production, and often the dialogue as well.[7]

4. Paul Wells uses this term in relation to sound in animation, but the principle is applicable through moving image production.

5. This was particularly true during the first five years of sound film, when the *single optical system*, as its name implies, made adding sounds and music to dialogue tracks extremely cumbersome. The practice of re-recording of dialogue to be accompanied by other sounds was thus rarely employed. The appearance of the *double-optical system* after 1932 ushered in a cornucopia of additional sound, until the 1940s almost invariably musical, as atmospheres and light FX would not be read over the hiss of the optical tracks.

6. Of course, such dysfunction can also be used to create filmic humour. In *Singin' in the Rain,* (Kelley/Donen, 1952) lip-sync problems cause hilarity, and much of the work of Mel Brooks (especially *High Anxiety* (1977)) relies on gags which exploit such dysfunction. In some film genres, Kung Fu in particular, sloppy sync is so engrained into the audience's expectations that deviation in the direction of accurate Foley and lip sync might create an opposite effect, calling the viewer's attention from the stylized narrative by the novelty of precision.

Synchrony in animation

Unlike live-action footage, animated images do not emerge with sounds attached. The images themselves, if representational, are often caricatures; if they speak, their voices are often either comic or exaggerated. If the animated images are abstract, the lack of even an implication of diegetic sound poses creative and cognitive possibilities for any composer/sound designer.[8]

Narrative-driven animated films comprise a huge array of styles, often dependent upon the makers' expectations of the generic 'contract' between themselves and their notional audience. Cartoons in particular, especially those emanating from the mainstream mid-century American studios, reach us with a set of generic determinants comprising not only how the images appear, but the nature of the sound and music which accompany them. Changes in industrial practice between 1950 and 1960 brought about a change in the way images (especially layouts) were produced, with a consequent move towards more abstract background environments. Such change was also prompted by the influence of post-war European animation (especially those emanating from eastern Europe) on American practitioners. Notwithstanding these post-war stylistic changes to cartoons, narrative-driven animations seem to fall into three broad categories:

Slapstick and mischief: In this category reside the bulk of commercial cartoons (usually of 5- to 8-minute duration) made in Hollywood. *Tom & Jerry, Bugs Bunny* (and all his chums at Warner Bros.), Disney's troop of animated personalities and many others can be so classified. The soundtracks of these films usually depend on 'musical signification', where violin glissandi represent falling (usually after being hit by an anvil), bass drum and/or tympani represent punches and other similar violence, and situations are underscored by recognizable musical fragments intended to evoke instantaneous recognition.[9] Such music is almost continuous and follows closely the gestures we can see. For this reason, close musical synchrony is often (pejoratively) referred to as 'Mickey-Mousing'.

Sit-com: Beginning with *The Flintstones* (Hanna-Barbera, 1960–66), and spawning many imitators, this animated series was similar to the Looney Tunes genre, but employed slightly less music, some of which was situational rather than representational. In any event, sit-coms are dialogue led, so the need for an elaborate soundtrack is minimized. Slapstick events were still accompanied by the usual assortment of music (and sometimes quasi-Foley). Later manifestations of this genre such as *The Simpsons* (Groening, 1989–present) and *South Park* (Parker/Stone, 1997–present) avoid most non-diegetic music and use heightened diegetic effects (sparingly) for important sound cues.

Feature film: Beginning with *Snow White* (Disney, 1937), this genre has tended toward using sound and music much as does non-animated feature films of the same period. The underscore, especially for Disney before 1960, is lush and orchestral and the interspersed songs are identical

7. Especially when the dialogue is recorded in an exterior location. The computer-aided ADR (Automatic Dialogue Replacement) process has made the practice more agreeable than the earlier 'looping'.

8. The term 'sound designer' in this context is meant to be read in the British/American context; one who takes responsibility for the sound world of a motion picture. The most famous person to whom one might apply this term (and was self-applied in his case) is Walter Murch.

9. Felix Mendelssohn's 'Spring Song' (1843, from his *Lieder ohne Wörter*, Book 5, Op. 62 no. 6), was habitually used to denote spring, and also dazed sleep, gormless love and other similar states.

in most respects to 'live-action' musicals of the same period. In fact, changes to the sound environment of animated feature film from 1937 to the present mirrors that of the live-action films with the exception of a tendency for greater musical synchrony (congruent with the proclivity of animated films to employ more slapstick than live-action films).[10] Recent computer-generated feature films such as *Shrek* (Adamson/Jenson, 2001) and *The Incredibles* (Bird, 2004) as well as model-generated animation such as *Chicken Run* (Park, 2000) so thoroughly emulate the structural and narrative world of live-action films, that the scores owe far less to the gestures of cartoon music and sound than they do to feature film soundtrack production practices. Also noteworthy, especially in the work of Nick Park, is the practice of animating to pre-recorded, quasi 'sync sound'. Park's *Creature Comforts* (to 1989) developed a style that was based largely around the dialects and characterizations of pre-recorded voices.[11]

Beyond the generic animation styles referred to above, a multitude of strategies can be found through which animators devise their work, producing animations that can be placed within a spectrum of practice from representational to abstract. Work by Jan Svankmjer, the Quay Brothers, Norman McLaren, Yuri Norstein and many others fall into this group. Some of the works produced are narrative, some surrealistic, others abstract and non-representational.[12]

It is within the area of non-representational, non-narrative, abstract animation that the effect of synchrony (or its absence) can seem most pronounced.

> Our World is in Synch. Nature is slavishly in synch. You can bet your life any time it will always be in synch. And this is the basis for articulation in cinema.
>
> (Kubelka 1998)[13]

Two films

To explore various aspects of the relationship between sound, music and images, scores and soundtracks were devised for two animations. The first of these was non-representational, the second was in narrative form. What follows below is an account of such experimentation with abstract images. The abstract animation was produced at the Hogeschool Gent, in Ghent, Belgium. Following on the work of Oskar Fischinger,[14] Martine Huvenne and Silvia Defrance provided animation derived from the fifth of Webern's *Six Bagatelles*, op. 9 (1913).

This animation was later used as the basis of several 'scores', thereby reversing the Fischinger process. Webern's original music is atonal and pointillistic,[15] and the structure does not contain any harmonic devices that might imply temporal trajectory.[16]

The film consists of different shapes, colours and textures moving across the plane of the screen in most possible directions. Figure 1 shows some of these shapes.

10. An interesting case study is provided by the work of Frank Tashlin (1913–72), whose early career as an animator at Warner Brothers influenced his later work as live-action director. The musical transition from cartoon to film is sometimes ambiguous, especially in the work he did with Jerry Lewis in the late 1950s and early 1960s, notably *Rock-a-Bye Baby* and *The Geisha Boy* (1958) as well as *Cinderfella* (1960),

11. Of course, two of Park's most memorable characters, Grommit and Sean the Sheep, are voiceless in the manner of silent film comedians.

12. I cannot resist the opportunity of mentioning *Gerald McBoing-Boing* (Cannon, 1950–59), whose entire being was expressed in the synchrony of an astonishing array of naturalistic sounds, which the boy uttered instead of words.

13. KUBELKA, Peter. School of Sound Lecture, 19 April 1998, London, Institute Français.

14. Oskar Fischinger (1900–67), modernist painter and animator, was particularly interested in the 1930s and 1940s with producing animations based on classical pieces of music. His influence on Walt Disney can be seen in *Fantasia* (1940).

15. Derived from the term used to describe the work of such painters

Figure 1.

Link Synch Mov.1 (mute) [http://www.intellectbooks.com/ST1.2/Deutsch/Synch Mov1.mov]

The first stage for providing a new soundtrack for this animation was to analyse the film in terms of 'events'. These are intended to act as anchors for sounds or musical gestures, and are based upon my own subjective reading of the images.

These 'markers' (see Figure 2) would help form the architecture of the accompanying music/soundscape, irrespective of the fact that there are several

H: m: s: fr	*event*
01:00:02:13	"3"
05:00	White
09:02	Start
10:00	Start blue
11:19	Box apogee
16:11	White
17:20	Small blue start
18:16	Blue out
20:16	Blue 2
21:10	Electric start
23:15	Add blue bottom
24:07	Blue out
29:00	Fade electric, add colour change
31:14	Red wash, big
33:12	Fade red wash
35:04	Red movements
37:17	Out
39:01	Purple from top
39:21	Out
41:06	Green
42:03	electric
45:09	Split electric
46:16	Purple
47:06	90° shift
47:20	Electric fade
49:05	Fade purple
49:18	Green from top 1.h.
50:24	Out
52:17	Yellow for logo
53:02	Green for logo
55:13	Purple for logo
57:03	Out
57:15	Purple from top right
58:03	+ electric line
59:23	Red out, start blue + box
01:01:12	Box apogee
03:07	Box fade + purple
04:02	Box grow
05:17	Box red + fade
08:22	White
12:01	Small purple + box start
15:16	Big red
16:12	Stasis
18:16	Begin fade
20:02	White
22:03	Fade to black
01:01:23:00	Out

Figure 2.

as Seurat and Signac, the use of pointillism in music can be similarly defined as the construction of music through separated sounds and gestures. It is a compositional process through which notes are heard as individual points or sounds rather than as a consecutive, linear progression. This style is most often employed in atonal music.

16. These issues are discussed at greater length in 'The soundtrack: putting music in its place' in *The Soundtrack*, 1: 1, pp. 3–13.

versions of sound/music composed to these images, each designed to offer a different perspective on the effect of synchronous sound on what is seen.

In the first version, the music/sound was designed as *musique concrète*;[17] in this case the combinations of sounds were generated in several ways:

- Sounds generated electronically, using Logic® 7's internal sound generators
- Sounds recorded acoustically and modified through Logic and Metasynth® software
- Sounds generated by samples and played within Logic

No concerted attempt was made to lock particular sounds with a specific images; some sounds attach themselves to more than one type of gesture. Some images, however, do attach themselves to specific sounds. It was considered important that the synchronous sounds should resemble the images to which they were attached: in duration, attack, harshness, etc. Two images illustrate this process of sonic identification. The first is an undulating line that travels across the frame diagonally.

17. *Musique concrète* is a term used to describe sonic/musical compositions delivered primarily through recording. The most famous early proponents and practitioners of this style were Pierre Henry and Pierre Schaeffer, whose seminal work in the late 1940s provided inspiration (and departure points) for many composers, notably Luigi Nono, Luciano Berio, Karlheinz Stockhausen and Edgard Varese.

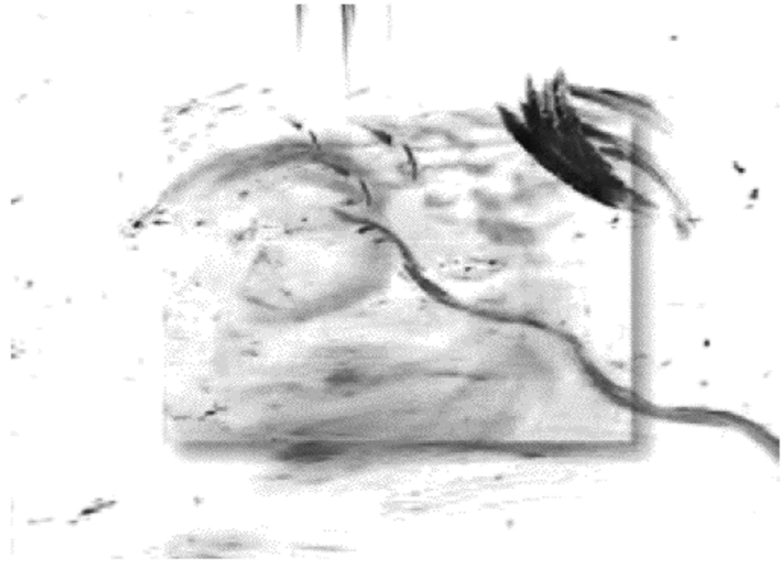

Figure 3.

This image (Figure 3) is accompanied by a sound derived from the call of a dusky lory, a colourful bird of the parrot family found in New Guinea.

LINK Synch audio1 [http://www.intellectbooks.com/ST1.2/Deutsch/synch audio1.wav]

The sound is only used with this image, as its rhythmic and sonic characteristics matched so conveniently with the shape and movement of the image.

The second image is of a blue dart that moves rapidly and disappears to the right of frame (Figure 4).

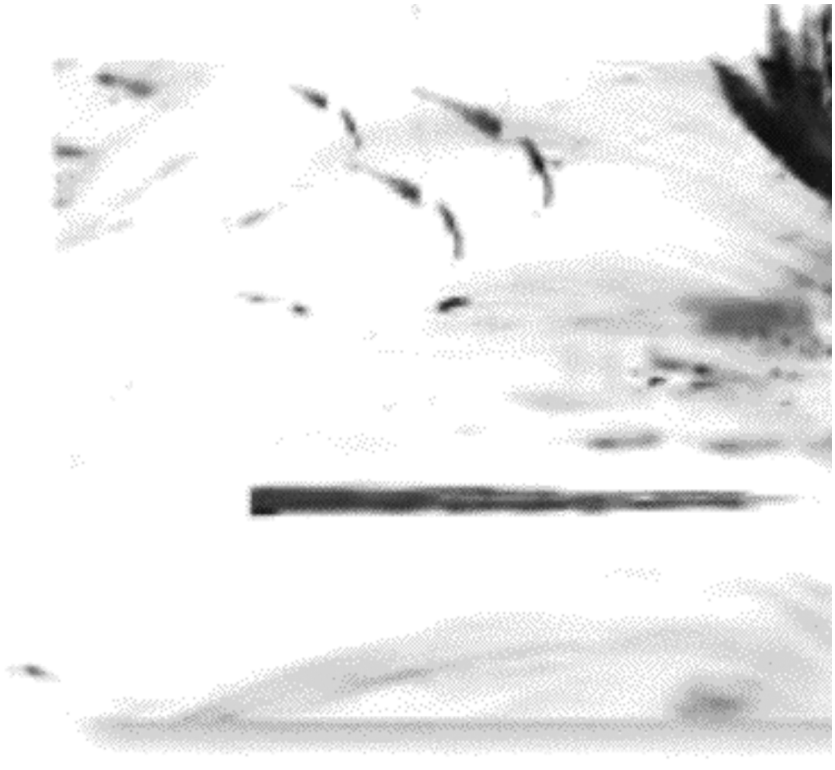

Figure 4.

This gesture was represented by a sound generated by a door closing. This particular sound was also used in other points in the soundtrack, but is most noticeable and prominently heard when accompanying the 'dart'.

LINK Synch audio2 [http://www.intellectbooks.com/ST1.2/Deutsch/synch audio2.wav]

Other sonic equivalences to shape and movement were similarly devised.

LINK Synch Mov2 [http://www.intellectbooks.com/ST1.2/Deutsch/synch mov2.mov]

The principal goal of this first version was to achieve artistic unity through the definition of sounds and their relationship with images in terms of length, trajectory, timbre and *punctus*, that is, the weight and attack of a sound. The synchronous intersection of those sounds with the images is intended to impart substance and meaning to what we see.

Viewers of the film would therefore be likely to perceive the images differently when sound is added. On one level, the decision to attach a sonic gesture to a visual one forces attention upon that gesture, places it in foreground relief against other unaccompanied images. The cyclic

architecture of this particular film is highlighted by the use of repetitive sonic gestures; we know that we have seen/heard certain things before, and we are able more easily to formulate an abstract narrative for what we see; to try to understand why we are seeing what we are seeing when we are seeing it. More importantly, the synchrony of sound and image implies that sound and image are part of the same world, part of the abstract diegesis presented. Each gains veracity from its attachment to the other.

A second version, with a different soundtrack, was produced by a student composer at the National Film and Television School, Beaconsfield, Matthew Davidson. While the work was done independently of other versions, and with no collaboration, certain similarities are clearly obvious between them. What is most interesting is that Davidson's sonic choices prompt the viewer to notice different aspects of the film, by accentuating the weight and trajectory of a different range of images. The sonic/musical language of both versions is similar, eschewing tonal harmony for a more abstract, pointillistic score.

LINK Synch Mov3 [http://www.intellectbooks.com/ST1.2/Deutsch/Synch Mov3.mov]

In the third version, a slightly different effect was achieved when the original synchronous track was placed in reverse time against the images.

LINK Synch Mov4 [http://www.intellectbooks.com/ST1.2/Deutsch/Synch Mov4.mov]

A fourth version placed the original soundtrack two seconds earlier than the original, so that points of synchrony were similarly delayed (or anticipated).

LINK Synch Mov5 [http://www.intellectbooks.com/ST1.2/Deutsch/synch mov5.mov]

In both of these latter versions, and despite some accidental synchrony, the effect seems to have been to present the viewer with two parallel narratives, related perhaps in texture and abstraction, but occurring in adjacent timelines. The brain can follow both but does not necessarily interconnect them, allowing each its own domain.[18] It is possible that in these cases the aural images occupy the foreground of the audience's attention at the expense of the visual, insofar as each sound contains more varied information, presenting the listener with a wider range of distraction.

The final version presented the images with an unconnected accompaniment, a fragment of a piece composed for an entirely different purpose.[19]

LINK Synch Mov6 [http://www.intellectbooks.com/ST1.2/Deutsch/synch mov6.mov]

In this case, notwithstanding the odd synchronous conjunction, the music and the images did not attach to each other. The music dominates, and the images recede from prominence, appearing to the author as if specimens in a jar. While each visual gesture is embodied with its own trajectory, there is no obvious overarching forward movement to the images (that they can be presented in reverse without losing meaning is evidence of this). The music, on the other hand, due to its tonal structure and slow harmonic rhythm, locks the listener into its own temporality and trajectory, enclosing the images as it does so, and causing them to recede in prominence as a result.

18. One must here allow for the fact that the viewer has seen all previous versions, each carrying its own imprint on how the next is perceived.

19. *The Windows in Ann's Flute,* © Stephen Deutsch (2003). The flautist is Susan Fitzgerald.

The lessons for the animator, composer and sound designer are implicit in what can be seen and heard as described above. An inverse relationship seems to exist between the need for synchronous sound and the abstraction of the images or, to put it another way, the less the viewer can identify the images as being 'real' the more synchronous sound is needed to suspend his/her criticality to enter the diegesis of the film, however abstract. Those animation soundtracks that eschew synchrony encourage the audience to read the images and sound at a purely abstract level, encourage the audience to engage with what they see in a fragmentary way. Of course, an intention by the animator to elicit just such an engagement is a respected approach to film-making. Many of such films ask the viewer to attend with previous contextual understanding, or to view the film as part of a larger construct: artistic, historical or political. In the same way, the intentional lack of synchrony between John Cage's music and Merce Cunningham's choreography asks the audience to see their work in a wider context, a context unlimited by an imposed narrative.

The second animation was in an orthodox narrative style. *Confessions of a Schoolboy* (2006) was directed by David Grey and produced at the Arts Institute, Bournemouth. Its style is that of a cartoon, and has been drawn to look much in the style of Warner Brothers in the 1960s (Figure 5).

Figure 5.

The story concerns a schoolboy who fantasizes sexually about a teacher, and as a result develops an unwanted, embarrassing and persistent erection. His attempts to deal with the problem provide the narrative thrust of the film.

LINK Synch Mov7 [http://www.intellectbooks.com/ST1.2/Deutsch/synch Mov.mov]

It was decided at an early stage that the music would be continuous and not chase action or gesture. Rather, the music would express the context in which the action takes place. It was decided to use a blues style for the music, with an alto saxophone to represent the more erotic street-wise sensibilities. The music had a previous life, as a revue song called 'Tired Feet'.[20] One of the more usual methods through which a director can choose the style of music s/he wishes for a composer to produce is to listen to the 'back catalogue' of that composer. In this case, the director, David Grey, not only wished for the music to be in the style of 'Tired Feet', but for the song to be rearranged and become the score for this film.

It proved very interesting that when laid onto the film, natural points of synchrony occurred between actions and gestures in the animation and musical events. The film seems to be in the same rhythm as the music. It was therefore a fairly trivial matter to highlight some particularly pointed actions with accentuated drumming without altering the flow of the music.

LINK Synch Mov8 [http://www.intellectbooks.com/ST1.2/Deutsch/synchmov8.mov]

One might reasonably suggest that given the addition of the school bell, this version could easily stand alone without the addition of further sound effects.

Sound

LINK Synch Mov9 [http://www.intellectbooks.com/ST1.2/Deutsch/synchmov9.mov]

The decision was taken that the film would contain sound effects, overstated in the manner of a Warner Brothers cartoon. The sound designer, Susannah Lawrence, provided five tracks of sound design and then combined those with the stereo music tracks. The addition of Foley and FX to the music track places the animation within the mainstream of cartoon animation, especially of the period centring on Hollywood in the 1960s. Each sound effect validates the image, authenticating what we see by an appropriate (if overstated) aural tag. Common with much in that genre, no attempt is offered to provide any atmos tracks, as one might find in live-action films.[21] That the environment is essentially silent except for music and effects does not create discontinuity in the mind of the viewer; indeed, a naturalistic atmos track in such an animation might be the cause of such unease, marrying naturalism with hyperreality in an unsettling way.

Conclusion

It is clear that the potentially vast subject of the relationship of animated images with their soundtracks has yet to be explored, especially if one leaves aside publications offering information on how technically to achieve such soundtracks. This article has made an attempt to engage in a study that may broaden our understanding and thus inform practice.

What does also seem apparent, even at this stage, is that there is a correlation between the representational vividness of images and the sounds that are appended to them. In abstract non-narrative animation, this correlation seems at this juncture to be one of inversion; the more abstract the image, the greater the implicit demand for synchronous aural gesture. In

20. Words by Peter Barnes (1931–2004) for the revue *The Devil Himself* (1979), performed at the Lyric Theatre, Hammersmith, London in April and May 1980. The music is by this author.

21. It is interesting that feature-length (especially) CG animations such as *The Incredibles, Toy Story* and *Shrek* opt for the full feature-film atmos track, in order to better present themselves almost as hyperreal live-action films.

representational animations, synchronous sound can take the place of synchronous music, providing authentication of the animated world.

This journal welcomes other articles that offer to expand or develop this area.

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