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April 2008

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Undergraduate Humanities Forum 2007-2008: Origins. 9.
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When I count to four ... : James Brown, Kraftwerk, and the practice of musical time-keeping before Techno

Abstract

"Of all creative artists," wrote Hector Berlioz in his famous orchestration treatise, "the composer is almost the only one to depend on a host of intermediaries between him and his audience" (Berlioz, 2002 [1856]: 336). These intermediaries – the orchestra and its leader and time keeper, the conductor – "may be intelligent or stupid, devoted or hostile, energetic or lazy; from first to last they can contribute to the glory of [the] work, or they can spoil it, insult it, or even wreck it completely" (Ibid.). From written score to performance, realizing a composer's work of music becomes an acute problem of both collective action and aesthetic interpretation. The chief mediator between the composer's artistic intention and its social realization is the conductor, who through his or her authority not only asserts and determines the tempo of a performance, but also establishes its nuance, feeling, and overall interpretation.

Comments

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“When I count to four...”: James Brown, Kraftwerk, and the practice of musical time-keeping before Techno

-David Reinecke

Introduction- The Ideal Conductor, Past and Present

“Of all creative artists,” wrote Hector Berlioz in his famous orchestration treatise, “the composer is almost the only one to depend on a host of intermediaries between him and his audience” (Berlioz, 2002 [1856]: 336). These intermediaries – the orchestra and its leader and time keeper, the conductor – “may be intelligent or stupid, devoted or hostile, energetic or lazy; from first to last they can contribute to the glory of [the] work, or they can spoil it, insult it, or even wreck it completely” (Ibid.). From written score to performance, realizing a composer’s work of music becomes an acute problem of both collective action and aesthetic interpretation. The chief mediator between the composer’s artistic intention and its social realization is the conductor, who through his or her authority not only asserts and determines the tempo of a performance, but also establishes its nuance, feeling, and overall interpretation.

More than “simply a time-beater,” the ideal conductor, according to Berlioz, possesses trained perceptual faculties, an out-going nature, a thoroughly music-theoretical mind, and the ability to transmit his feelings to the musicians he directs (Ibid.: 337). If successful, the conductor’s “feelings and emotions will then pass to [the orchestra], his inner flame will warm them, his electricity will charge them, his drive will propel them” (Ibid.). From a sociological perspective, conductors enjoy and exert charismatic authority, which relies upon a group’s “devotion to the exceptional sanctity, heroism, or exemplary character of an individual person, and of the normative patterns or order revealed or ordained by him” (Weber, 1976 [1922]: 215). Conductors are then the

motive force behind the regular and organized operation of the orchestra (see Faulkner 1973 for when this goes wrong).

Yet beyond the almost supernatural abilities of the ideal conductor, there remains a more mundane mechanical aspect as well. As Berlioz chided above, the conductor emerged historically as the time-beater for groups of musicians, first in the 18th century with a large staff, then later in the 19th century through subtle gestures with a baton (Spitzer and Zalizaw, 2004: 340-341). Keeping time for the orchestra was first and foremost the chief duty of the conductor, the foundation upon which all other musical interpretations and nuances rested. No amount of genius could be realized if the orchestra could not play in time together. For Berlioz, the process of time keeping begins with a meditation on the work in question:

The conductor must above all have a clear idea of the main features and of the character of the work whose performance or rehearsal he is to direct, in order to be able to set at the outset, without hesitation or error, the tempo the composer intended. If he is not in a position to have received instruction directly from the composer or if the tempos have not been handed down by tradition, he must refer to the metronome marks and study them carefully, since most composers today take the trouble to write them in at the beginning and in the course of their pieces. I do not mean to imply that he must copy the metronome's mathematical regularity; any music done that way would be stiff and cold, and I doubt that one could maintain such level uniformity for many bars. But the metronome is, all the same, excellent to consult in order to establish the opening tempo and its main changes (Berlioz, 2002: 338).

Thus, setting the correct tempo for a piece is a distributed and mediated affair. Scores must be consulted, metronome marks noted, judgment exercised, and finally mechanical time-keeping devices set into motion. We see then the other source of the conductor's power distributed throughout the various artifacts that he or she assembles in both setting and enforcing time.

In particular, Berlioz's admonition of following the metronome too closely, lest the music become "stiff and cold," immediately prefigures and reminds modern readers of similar criticisms of contemporary electronic dance music, (in)famous for its repetitive rhythms. Though Berlioz recommended that conductors consult or employ metronomes cautiously, electronic dance music commonly inverts this practice by employing similar time-keeping devices to essentially determine and enforce a particular tempo. As such, the social, aesthetic, and technical implications of replacing the human center of time keeping with a mechanical device cannot be underestimated, in turn reshaping notions in the present of who or rather what constitutes the ideal conductor. This dance of agency between humans and non-humans (Pickering 1995) in musical time keeping lies at the center of the story presented here about the origins of Techno music.

An Origin Myth for Techno

The point of departure for our story on the origins of techno music is a short quote by genre pioneer, Derrick May, contained in the liner notes of one of the first successful techno compilations from 1988. When asked to define the emergent genre of techno, May offered the following colorful simile: "It's like George Clinton and Kraftwerk are

stuck in an elevator with only a sequencer to keep them company.”¹ May’s definition doubles as an origin myth; suggesting that techno music is the result of a mediation of black Funk music (represented here by George Clinton) and German synthesized pop (Kraftwerk) by a sequencer, a piece of music equipment designed to trigger musical events at a fixed rate.

May’s inclusion of the sequencer with Kraftwerk and George Clinton acknowledges the debt electronic music has quite obviously to both human musicians and non-human technologies. This relation between man and machine, as Kraftwerk put it so eloquently in their 1978 LP *Die Mensch Maschine*, lies at the foundation of techno music. We see it in the synthesized and artificial timbres, the bleeps and the beeps, the futurism of album covers and promotional material, the repetitious rhythms beloved and bemoaned by many, the often-robotic demeanor of its artists, so on and so forth. Within the history and sociology of technology a common methodological move has been to assume a general symmetry of agency between humans and non-humans alike; that is, both can impose, hinder, or permit certain kinds of action (for an overview, see Latour, 2005). This is not to overly anthropomorphize artifacts or symmetrically reduce humans to dehumanized and predictable robots, but rather to sensitize our analysis to the myriad ways in which our world is shaped by ourselves and our tools and technologies.

This paper traces a small subset of these complicated relations between humans and non-humans in the pre-history of techno music, through examining the set of musical and technical practices that would become essential later on for producing this and other sub-genres. The question I want to answer is how did musicians stay in time with each

¹ Techno: The New Dance Sound of Detroit (Virgin, 1988).

other before techno. Central to my argument is that this problem was first solved through primarily human-centered interactional and institutional means coordinated by a charismatic conductor in funk music and then later in synth pop through a gradual rationalization/co-mingling of both human operators and their tools (sequencers, synthesizers, drum machines) contributing in part to the set of practices, conventions, and cultural productions, we understand today as techno music. While such rationalizing efforts are commonly understood to quote Max Weber as a further “disenchantment of the world,” for the artists who engaged in these rationalizing practices, such integration was seen in a positive light, allowing for both new musical possibilities and a level of precision and accuracy never before experienced (Weber, 1946: 155, see also Goodwin 1992). Before we can adequately explore how early genre pioneers kept time, we need a broader theoretical understanding of time and time keeping.

Time and Time Keeping: A Sociological Perspective

Though each person individually may experience the passage of time differently, shared standards for time and time keeping, what Durkheim called “social time,” facilitate all facets of our social existence (Durkheim, 1995 [1912]: 10n6). From the work week and weekend to timetables and daily routines, commonly shared ways of keeping time help structure our everyday activities on a fundamental level. This is accomplished in part through the coordination of external devices like the calendar and clock, the implementation of conventional units of time such as the day or hour, and the routinization of enduring habits like our morning rituals.

Temporal structures and references vary from social group to social group. A family may structure their day around meals or the working hours of parents (Perlow

1998). A firm may set roadmaps to help manage the temporal uncertainties of research and development. Even nation states or now the entire world have worked to standardize and harmonize time and time keeping through the creation of the International Date Line, Greenwich Mean Time as an international standard, and 24 separate time zones, all important temporal institutions that shape our social world (Zerubavel, 1982). Time from this human centered, culturally specific perspective remains open to interpretation and change. And yet for all of its socially constructed trappings, we often understand and measure time as inviolable, quantifiable, and objective. No matter how social groups define the situation or structure their activities temporally, a second remains a second; the clock continues to tick away. As such, time can determine or powerfully constrain the actions of individuals, since we are powerless to change it on this objective level. Time is outside of human activity; an objective measure like any other (distance, volume, velocity) and yet bound up inextricably with everything we do. Within the social sciences and the humanities, this dichotomy is commonly expressed as clock time (objective) versus event time (subjective) (Orlikowski and Yates, 2002).

While remaining on one side of the dichotomy may have methodological benefits, attempts to resolve this dichotomy may also lend theoretical fruits. Taking a cue from sociologist Anthony Giddens' theory of structuration, Orlikowski and Yates offer up a practice-based perspective on temporal structuring as a possible solution (Ibid.). They argue that time is experienced within an organization (their social unit of analysis) through shared temporal structures (work schedules, tenure clocks etc.) rooted in ongoing human action. Temporal structures act to enable and constrain certain actions and if repeated enough reproduce and reinforce particular legitimate temporal orientations

toward action and work (i.e. the right way to do things). Over time temporal structures take on an objective quality while being rooted in the everyday interactions of actors within a certain organization, bridging together the dichotomy between clock time and event time.

Orlikowski and Yates' proposed theoretical solution offers us a way to study time in motion, but overlooks an important more fundamental distinction inherent in clock time versus event time, that of the human versus the non-human. More than simply embedded in reproducing cognitive structures as Orlikowski and Yates suggest, time and time keeping have an equally important material existence. By highlighting the material aspects of time and time keeping, I am not suggesting we move the analysis of time squarely into the objective realm (clock time). On the contrary, as illustrated by the introduction, setting and enforcing the tempo for a particular piece of music is an act distributed across multiple artifacts, aesthetic judgments, and human actors, coordinated through purposeful actions of the ideal conductor. Thus, experiencing time emerges from the sustained interaction between human and non-human actors. Like Orlikowski and Yates, this distributed model of time and time keeping remains practice-oriented but looks additionally to how durable compromises are formed between human and non-human actors as integral to how we understand time. What is key is that humans and non-humans alike both possess the agency (though in different amounts) to enable and constrain how temporality is experienced and understood between actors in the situation. To use a mundane example: a clock may tell us the time, but we are also responsible for winding it up or putting batteries in it, wearing it or placing in a conspicuous place. As a result, meaningful change to the temporal structures of a social group can only arise

through the mobilization of both human and non-human actors. To see this perspective in action, we return to the mythical origins of techno in funk music and early electronic pop.

Keeping time before techno

I begin not with P-Funk but someone more foundational, James Brown. Scholars, artists, and enthusiasts all point to Brown as the founder of Funk, Hip-Hop, and a whole host of other sub-genres to which we can include techno properly qualified of course (Brown, 1994; Stewart, 2000). Moving quickly from more traditional RnB (think “Prisoner of Love” or “Caledonia”) that marked his early career, Brown in the late 60s, cultivated a new sound and a band to match, creating across several albums many of the stylistic conventions central to funk music. His songs were harmonically static; the band essentially stayed on the same chord for 7-10 minutes, breaking only at Brown’s expressed permission to “take it to the bridge” or “the turnaround.”² The true action and allure of Brown and his band for many was not in the static musical nature of funk but rather in the groove; the synced interplay of the bass, drums, and Brown’s grunts and hollers. Brown’s elevation of the beat to nearly mythic proportions could only work to the extent Brown and his band, which at times had upward of 10-15 people, could stay in time with each other, known commonly as playing in the pocket.

Brown’s method of insuring this tight coordination was nothing new; he just did it better than anyone else. Staying in time collectively became a relational matter for

² See James Brown, “Sex Machine.”

Brown, emerging only through the sustained and routinized³ interaction between himself as charismatic bandleader and his band. Bootsy Collins, Brown's bass player during this period and later for George Clinton's Parliament Funkadelic recalls Brown's style of conducting:

He told us, "All I'm going to do is call out the songs, drop my hand, and y'all are going to hit it," and that's actually what happened. After that first show he reassured us that everything would be fine once we rehearsed the songs and learned how he used his body movements and hand signals for the show (Anon, 2005).

Without a score and playing mostly by ear, the band relied on Brown's series of verbal cues and non-verbal gestures to both stay in time and coordinate complex musical transitions and movements. Additionally, Brown developed other external means of control and discipline. Much to the consternation of his dancers and band, Brown would fine anyone who missed a cue, step, or beat upwards of twenty-five dollars a mistake depending on the severity of the misstep. Rather than call out performers while performing, Brown developed another set of much-feared hand signals to dole out punishments mid-song.

Not everything for Brown, however, was negative reinforcement. For exceptionally good solos, well-executed transitions, and funky drum breaks, Brown would reward individuals in the band by calling out their names on stage and even while recording, giving them the spotlight briefly until taking back the mic and refocusing the

³ This is similar to Weber's discussion of the routinization of charisma, in which charismatic authority must be traditionalized or rationalized in order to be sustainable over time. See Weber, 1978 [1922]: 246-254.

attention on himself. These instances of Brown's intra-band, in-the-moment reward system are some of the most endearing moments for listeners. In particular, Brown gave the most attention to the drummers in his band, especially during the drum break, the point in the song in which every instrument dropped out except the drums. These breaks, the most famous of which occurred on Brown's 1969 song, "Funky Drummer" would later become the most sampled drum hits in history, providing the rhythmic foundations for everyone from NWA to Sinead O'Connor.⁴

Like in Jazz, the drum break comes toward the end of the song. Unlike in Jazz, where the drummer would be expected to let loose and break from his steady rhythm to solo, Brown demanded his drummers keep playing the exact same funky beat, which explains their later popularity for being sampled, as the beat was regular, predictable, and importantly loopable. With the Funky Drummer break, we see the apotheosis of Brown's method of time discipline. While everyone focuses on the break, about a minute before the break hits we see something equally important. In precise language, Brown raises to discourse the exact parameters of what the band and drummer are going to do, while concurrently praising the drummer's abilities. It is as if Brown is giving the band and us a verbal picture of his mental arrangement:

Fellas! One more time, I wanna give the drummer some of this funky soul we got here. (Reward)

You don't have to do no soloing, brother. Just keep what you got. Don't turn it loose, cause it's a mother. (Instruction to the drummer)

⁴ NWA, "Straight Outta Compton"; Sinead O'Conner, "I Am Stretched on Your Grave"

When I count to four, I want everybody to lay out and let the drummer go.

When I count to four, I want you to come back in. (Instruction to the band)⁵

These moments of arranging on the fly were central to Brown's performance as a bandleader and front man. While behind the scenes, Brown often delegated leading rehearsals to another person in the band, part of the myth behind Brown was that only through him could the band function and time flow; he was the charismatic authority behind its regular operation. Toward that end, Brown cultivated new talent almost as fast he fired it, never allowing anyone to challenge his disciplined grip over the band (For example, Brown fired Bootsy Collins after discovering he took acid before a show and was therefore unable to play properly). While everyone had to work together to keep in time, it was ultimately Brown who set and enforced it.

With Brown we see one way of how musicians stay in time with each other, which relies upon charismatic authority to assert itself over a group of assenting individuals. For himself and his band, Brown made precision, accuracy, and discipline core values to be upheld during performance. This was achieved, as we have seen, largely through interactional and institutional means, not as we will see for the early pioneers of electronic music through primarily electronic means.

Brown's cult of personality and sound were adored and emulated during the 60s and 70s, throughout the world. Surprisingly, some of his biggest fans were in West Germany, who saw Brown's black funk as revolutionary alternative to the predominantly white US and British rock that saturated the West German pop markets in the 1950s and

⁵ James Brown, "Funky Drummer."

1960s (think of the Beatles who got their first break in Hamburg). Concurrent with the '68 riots in France, German rock music like other German movements in film, art, and literature experienced a rapid and pronounced reconfiguration and redefinition of their motivations, influences, and subject matter. German rock musicians in the late 1960s desired above all a break with the immediate past in order to carve out a new discursive and musical space. For German bands in this period, such as Can, Faust, Tangerine Dream, Neu!, and Kraftwerk, this meant inscribing a new set of influences and practices, both past and present, that distanced itself from more traditional Western rock. Suddenly the kids were taking acid and listening to avant garde composer Karlheinz Stockhausen, black funk became popular, Weimar culture was revitalized and adored, Neo-Dada and situationism became trendy, eastern drone music could be heard everywhere, and a whole host of new technologies like the synthesizer and drum machine were introduced into the studio and stage. Kraftwerk, the musical pairing of Ralf Hutter and Florian Schneider, two classically trained, Düsseldorf Conservatory dropouts, was largely indicative of these contemporary shifts; James Brown was their hero, while they studied under Stockhausen.

Hutter and Schneider initially began as an avant garde noise band, but quickly abandoned this for a more minimal electronic set-up, which combined processed flute sounds, synthesizers, and more standard rock instruments like guitars and drums to produce a very primitive early synth pop. Across their first three albums, Kraftwerk introduced more and more electronic elements into their music, while removing or heavily processing the remaining acoustic sounds. The first to go were the drums, as Hutter explained in 1982:

Our music was always very energetic rhythmically. [...] We always had problems with drummers because they were always banging, and they didn't want to turn electronic. We were working with feedback and tape loops and things and they didn't understand that. Also ordinary drums are very loud on stage, but past the tenth row you can't hear them. A loudspeaker, on the other hand, you can place anywhere in the room (Aikin, 1982, 203).

Interestingly enough, Kraftwerk's initial dissatisfaction with acoustic drums was not with the rhythmically unstable human player but rather with acoustic drums' difficulties in precise timbral and volume control. Hutter and Schneider's solution was to trigger drum machines, over which they had complete tonal and volume control, by manually playing a series of drum pads. These drum pads would feature largely in Kraftwerk's 1974 synth-pop epic, *Autobahn*, a 22 minute road jam, merging synthesized car horns, engine sounds, and robotic vocals. All the sounds for the album though increasingly electronic and artificial were played by hand, including the drums. Though the instruments changed, how Kraftwerk stayed in time during this period would have differed little from James Brown's method of verbal and non-verbal cues and overall group discipline, with one important difference; in the studio Kraftwerk played to a click track or metronome.

This would change with the release of their 1978 LP, *Die Mensch Maschine*. Gone were expressionistic flowing melodies of *Autobahn* for a more mechanical sound, signaling the new minimal direction that would mark the remainder of their career. *Die Mensch Maschine* also featured increased use of a technology that would come to dominate Kraftwerk's way of producing music, the step sequencer.

The sequencer, an important and often neglected musical technology by scholars was first developed by synthesizer pioneer Don Buchla in the early 1960s in order to ease the production of electronic music for his experimental composer friends. Throughout the 1950s and 1960s, making electronic music was often a time consuming process of recording single notes or phrases to individual pieces of tape and then literally patching all the bits of tape together to make a composition; a single piece could take months (Pinch and Trocco, 2002: 39-41). Buchla decided there was an easier way to do this through automating the process of playing notes on a synthesizer. He devised a bank of discrete knobs, which could be assigned to any function of the synthesizer – usually pitch – triggered at a set frequency by an internal clock. The result was the first step sequencer in which musical information such as pitch commands could be programmed in by hand as a series of discrete steps, the sequence, and then automated to play back indefinitely.

During the recording of their 1977 LP, *Trans-Europa Express*, ever industrious, Hutter and Schneider built their own step sequencers and short melodic sequences can be heard throughout the album.⁶ However by 1978, Kraftwerk were using sequencers to trigger nearly every aspect of the music from the melody and bass line to the drums. This was done to ease the process of producing electronic music; once everything was programmed into the sequencers, one simply had to record the results onto tape as Hutter explained, “We don’t do that many overdubs because our machines are working and we set up everything simultaneously [...] We go for the total sound at once” (Ibid: 204). Drawing inspiration from funk and disco music at the time, Kraftwerk attempted to translate the rhythms of Brown and P-Funk into discrete programmed steps; the results of

⁶ See especially “Europe Endless.”

which was a something between mindless mechanical repetition and cold funk. The question of staying in time then for Kraftwerk only required that all the banks of sequencers be slaved to one master clock. Performing live, Kraftwerk simply had to trigger the sequencers to start a chain of musical events. While Hutter reserved some of the melody lines for himself to play by hand, by and large the question of staying in time and coordinating action within the band was left to the banks of sequencers that dominated the stage.

After this period, the sequencer and its ability to coordinate everything externally expanded to nearly all aspects of Kraftwerk's persona, performance, and music. Kraftwerk began touring with a set of life-like fully opposable automata, which could be synced to the beat. During the song, *The Robots*, Kraftwerk went so far to leave the stage and let the robots "play" the music. Hutter at the time began joking to the press, "We are thinking of playing in two cities at the same time. We can send some computers to concert halls in different cities" (Ibid: 203). Quickly understanding how boring their shows could be, Kraftwerk pioneered rough means of syncing movies and early computer generated graphics to their songs, now a standard feature of most electronic music performances. The merging of technology, music, and video, they called *Total Music*. Far from musicians, Kraftwerk saw themselves as "music workers," or "scientists" toiling in their studio laboratory and on stage (Ibid.).

Kraftwerk's solution to the question of how musicians stay in time stands in stark contrast to Brown's system.⁷ Gone were the external rewards and fines and the human-centered nature of coordination for a mode of collective action synchronized and

⁷ See table 1.

sequenced by external machines. For Brown, coordinating action was situationally defined, as it was dependent on the continual co-presence of himself and his performers. For Kraftwerk, the situation or performance space had little bearing on coordinating musical action together; the sequencer worked regardless of its human operator's capacity to see each other or even be present at all. This removal of the human operator manifested itself elsewhere for Kraftwerk. Starting in 1978, they suppressed in public any mention of individual members, always referring to themselves as a collective "we" in interviews, even if only one person (usually Hutter) was talking, and all press shots were of their robot counterparts, instead of themselves.

In the immediate period after the late 1970s, these two ways of staying in time were fused together not in May's mythical elevator but in the discos of Chicago, Detroit and New York. Mining records for beats, DJs, many of which would become techno pioneers later on, immediately began mixing together Kraftwerk, P-Funk, Euro disco, English synth-pop, anything that had a strong and regular rhythm. The potential to extend, shorten, or tease out any section of the record was a powerful tool in the right hands, something Hutter recognized early on, hearing his own rhythms mixed into an endless groove:

I remember we went to a loft club in New York around the time of Trans Europe Express, and the DJ had pressed his own record, using our tapes of Metal On Metal (*ed.* a song of theirs), but extending it on and on. It was the beginning of DJ record making, and we were fascinated. It was just in our direction, because that's what we would do in our studio, establish a

groove and play it for hours and hours. Maybe go out and come back hours later, and the machines would still be playing (Witter, 2006: 54).

The gradual co-mingling of these separate genres and separate ways of time keeping through a new mediator, the DJ, presents another way of time keeping essential to techno. In terms of time keeping, the DJ stands somewhere in between the human-centered focus of Brown and the mechanical focus of Kraftwerk, reproducing each time keeping practice via recordings (imagine mixing a James Brown record with Kraftwerk)⁸ and syncing both in time mechanically and manually using multiple turntables, a practice known as beatmatching (Brewster and Boughton 2000). The beatmatching process of syncing two separate records revolves around a well-rehearsed repertoire of keen ears, quick gestures, and specialized technology. DJs must advance and reverse the record slightly, speed up and slow down the record using the pitch control, mix back and forth with the cross fader, and start and stop the records at the right time. A further exploration of DJing is outside the bounds of this story, but serves as another reminder that time and time keeping emerges out of a meaningful interaction between human and non-human actors.

Conclusion

Across the three examples of musical time keeping practices before techno presented here, temporal structures are enacted and musical coordination facilitated only through the meaningful interaction of humans and non-humans, though accordingly in different amounts. What is important, eschewing the artificial divide between clock time and event time is that technologies, as presumed keepers of objective time, do not

⁸ Indeed the 1980s electronic outfit, the Information Society made it a habit when sampling Kraftwerk to also sample James Brown.

necessarily have to act as a constraining force. Instead, in the case of Kraftwerk, the sequencer allowed for a new level of precision and synchronization between all facets of their live show and music making, coordinating together the entire experience both aural and visual. Conversely, human-centered practices can be even more constraining and enforce a stricter sense of discipline than any technology as evidenced by James Brown's tight control of his band. In certain contexts, such as within creative organizations like a musical group, temporal constraint remains something to be negotiated between the actors at play.

Unlike in pop music, where authenticity is commonly (and falsely, according to Firth, 1986) attached to its human aspects, techno commonly suffers from the inverse, in that human aspects are downplayed or ignored in its music production. Commonly its history told from a production standpoint remains a story of technological evolution rather than tracing the human networks behind it. In a sense, the story told is a similar story of gradually removing the uncertain human aspect to make music making more efficient. This narrative shares several affinities with the history of scientific objectivity as related by Loraine Daston and Peter Gallison. They argue that it is better to speak historically of objectivities rather than objectivity and elaborate upon one of its many forms in particular, what they call "mechanical objectivity." (Daston and Gallison 1992). Mechanical objectivity, according to Daston,

strives to eliminate all forms of human intervention in the observation of nature, either by using machines, such as self-inscription devices or the camera, or by mechanizing scientific procedures, as in deploying statistical techniques to choose the best of a set of observations (Daston 1995: 19).

It is born out of an understandable impulse that human senses and exercise of taste or judgment impinge upon the collection of facts. From James Brown through Kraftwerk to

the DJ, did techno music become a similar space of mechanical objectivity? I would argue no. As I've demonstrated in this discussion of musical time keeping, the human element however marginalized throughout history reasserts itself symmetrically with non-human aspects. Rather than siding solely with the underappreciated human aspect or focusing on the overemphasized technological aspect, new narratives about techno music should strive to walk in between. It is only through exploring this meaningful interaction can we form a more complete picture of the distributed practices that sustain techno.

Table 1 – A Comparison of Brown's and Kraftwerk's Systems of Coordination

	James Brown	Kraftwerk (after 1978)
Focus	Human-centered	Machine-centered
Time	Relational/hierarchical	External clock
Enforcement	Cues/fines/rewards	Connectivity/ Slaved together

Uncertainty	Unstable human players	Tech breakdown
Improvisation	Possible	Limited

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