Design for Wow 2 – Music

Darrell Mann
Systematic Innovation Ltd, UK.
Phone/Fax: +44 (1275) 34296.0
E-mail: darrell.Mann@systematic-innovation.com

Chris Bradshaw
Head Of Music, Malmesbury School, UK
Phone/Fax: +44 (1179) 342960
E-mail: chrisbradshaw2000@hotmail.com

Introduction

A couple of years ago we wrote an article on the subject of Design For Wow (Reference 1). In that article we made the hypothesis that 'wow' design solutions across all forms of human endeavour came about when a conflict of some kind was resolved in the eyes of the person experiencing the 'wow'. The article featured a number of 'wow'-like design solutions from a variety of different areas. This article forms the first in a series of follow-on studies where our aim is to delve more deeply into specific subject areas in order to explore the 'wow' phenomenon in a little more detail. The subject this time is music. In other articles, we will be broadening our scope to also look at 'wow's in other fields such as advertising, literature, art, film, architecture and design.

The aim of this article is first and foremost to explore the 'wow' phenomenon in its musical context to see if there are any general rules and patterns that might eventually come to explain what 'wow' means. While it is not our intention to actually utilise any such patterns that do emerge – at least not in this article – a secondary aim of the article is to explore the possibility that, should rules and patterns exist, it might be possible to systematically compose 'wow' moments into current and future musical compositions.

We begin our journey by describing the methods used to determine and uncover the musical 'wows' that will form the spine of our argument:

Method

In many ways what makes a listener elicit a 'wow' reaction is very subjective. What makes a person experience a wow one day might leave them cold on another. There is, in other words, an issue of emotional context to contend with. In the first instance, then, we have tried to isolate such issues by including inputs from a wide variety of sources; partly through scanning the extensive music literature, and predominantly through access to large numbers of staff and students at an upper school in the UK. In all, over 90 people have contributed to the study, via a series of music lessons that spanned several hours of curriculum time. Participants were asked two basic questions:

1) identify pieces of music or musical moments that more often than not create and emotional wow for you
2) identify what it is about that piece or moment that caused the 'wow' moment to occur

Once thoughts and ideas were collated, they were discussed in groups within the class. The aim during these discussions was to obtain some form of agreement over which pieces of music did or did not constitute a general 'wow' classification, and then to agree the musical basis for that wow. Our starting assumption for the second part of this discussion was that 'wows' occur when something happens that the listener was not expecting to happen. Hence, for each candidate musical 'wow' the groups contrasted what they *expected* to happen against what the composer *actually did*. We can see the results of this comparison later in our results Table. It is worth mentioning from the outset though that very early on in the analysis we could see that our starting assumption was a valid one. In fact during the process of reducing the total set of inputs down to the ones included here, we did not eliminate any example where there was no discrepancy between what did happen and what was supposed to happen.

We take some encouragement from this finding since it demonstrates strong consistency with both the Contradictions part of TRIZ, and with the central phenomena of what makes humour work. In this latter regard, a different earlier article (Reference 2) has discussed the underlying basis of jokes; that the joke teller sends the listener in one direction, while the punch-line lies in a different direction. People 'get' a joke when they suddenly bridge this gap between where they are and where they were supposed to be – Figure 1. In other words, humour happens when our mind resolves this what-I-expected-to-happen versus what-actually-happened conflict

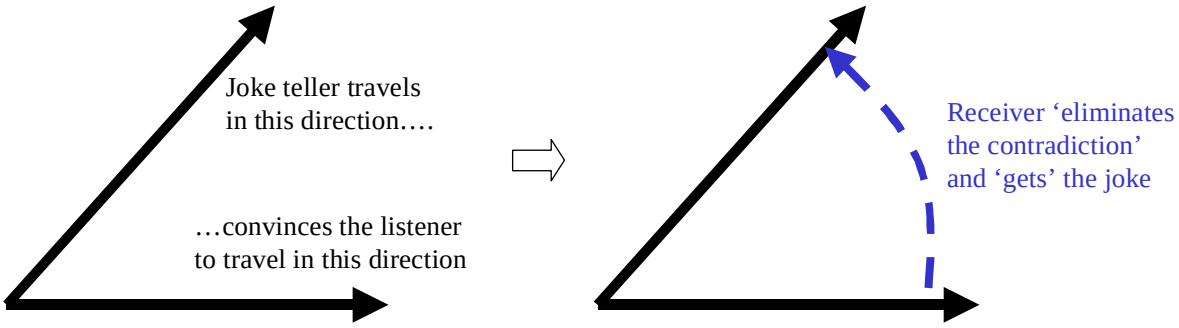

Figure 1: Conflict Elimination As The Basis For Humour

There is probably no better way of killing the humour in a joke than by trying to analyse it (one of the reasons we still haven't published our 40 Inventive Humour Principles article!). Likewise, there is a danger here that analysing a piece of music might turn out to be a wonderful way of spoiling our future enjoyment of it. We tried to pay particular attention to make sure we didn't fall into this trap, especially during the latter analytical phase of the study. Fortunately, our participants seemed highly motivated to think about and share their answers to the 'wow' question. To the extent, in fact, that the format looks like becoming a regular feature in the music teaching curriculum; the students enjoy the experience (especially since they were totally free to pick whatever genre of music they liked), and they also learn an awful lot about the 'rules' of musical composition. Actually, in light of the 'wow'=conflict-resolution hypothesis, they get to see how other people managed to break those rules.

So, with the hope that the analysis presented here inspires you to go and listen (or re-listen) to a piece of music rather than puts you off listening to it ever again, here are the results of the study:

Results

The following Table includes the following information; the name of the piece and its composer, where in the piece the wow comes (included here primarily for those readers that might want to go and listen to a particular piece), what was supposed to happen, and what actually happened. The right-hand column in the Table then attempts to match the 'wow' to one or more of the 40 TRIZ Inventive Principles.

Clearly we are not trying to insinuate in any way that any of the composers actually used TRIZ to achieve their 'wow', but merely try to analyse what happened in order to see whether what did happen fits somehow into the TRIZ framework. The idea here is that if something doesn't fit the framework, then great because we get an opportunity to potentially expand the framework, and if something does fit the framework, also great because it adds another piece into the jigsaw puzzle that might one day present us with a framework that is in someway 'universal'.

Piece	Composer / artist	Track timing	What the listener expects	What is done to create the 'WOW' response	Prin-ciple
You Make Loving Fun	Fleetwood Mac (Christine McVie) 1997 (live version)	0.45 – 1.16	A continuing 8-beat quaver drum rhythm and a similar shape of melody to the verse.	The drums go to half time; the guitar plays a counter melody to a far 'jumpier' bridge vocal. The chorus line is only revealed, curiously, in a coda at the very end of the piece. This bridge, consequently takes centre stage in the song, which is rare.	19B 17
Rock The Casbah	The Clash (1982)	2.13 – 2.22	The second chorus as normal.	The second chorus does return, though with a highly amplified and reverberating scream on the final note of the second verse, enhancing the already potent and playfully insinuating chorus.	38
Bad Love	Eric Clapton (1989)	3.02 – 3.55	A guitar solo, presumably over the verse accompaniment.	An alternative 2 bar groove, starting on the rhythm guitar, building up throughout the band, until Clapton comes in with one of his most sublime solos since Cream, before the song intro and chorus reprise ensue.	19 5
Peg	Steely Dan (1977)	1.26 – 2.10	The second verse, sung by Donald Fagen.	A guitar solo, chosen from an apparently huge variety of session player takes, which fits the jazzy harmonies as if it were notated – it isn't! An early instrumental solo is a notable variation on accepted song structure.	10 15

The Voice	Ultravox (1981)	2.43 – 2.58	An instrumental solo over the verse accompaniment, or a chorus repeat.	A middle eight in a major key played on the guitar; before reaching its pinnacle, as the minor key chorus accompaniment enters, with a trill over the piano melody	10 13
Won't Get Fooled Again	The Who (Pete Townshend)	7.30 – 7.49	The ostinato synth figure to stop… somehow!	The pattern changes to an insistently repeated note; cue Keith Moon to start playing 2 bar tom tom fills, increasing in complexity until a one bar semiquaver snare fill leads to one of the greatest screams in rock, heralding the intro chords and the final coda.	17 19 38 12
Hold On	Yes (1983)	3.25 – 3.41	Another chorus repeat	A lead guitar ostinato pattern over a steadily rising bass /chord progression building to the chorus repeat – adding considerably greater impact	35
You and I	Queen (John Deacon) (1976)	0.42 – 0.57	A chorus (even though the title appears in the first verse)	A third section sung in choral harmony and answered by a layered guitar melody. It is a real aural surprise – not to everyone's taste! Genuine prettiness in rock n roll.	10 7
Piano Concerto No.1 in B flat minor – first movement	Tchaikovsky	5.56 – 8.00	Either a full statement of a new theme or a return to the better known opening anthemic melody	Two alternating statements of new themes (on wind and strings respectively) over a minute's worth of music, before the former is decided on with a rhapsodic romantic piano figurations and a tutti (full orchestra) accompaniment.	1 3
Night and Day	Cole Porter	From the beginning up to the first statement of title line	An introductory melody with chordal accompaniment before the main body of the song.	A lone tom tom and lower brass underpin a single note melody for 4 bars before it shifts chromatically upwards, until a quick descent of 2 notes precedes a repeated single note on 'you, you, you'. 20 bars on….we have the first chord. For the 1940s - wow!	17 10

Afraid of Sunlight	Marillion (1995)	3.40 – 4.52	The instrumental solo over the verse or chorus accompaniment.	An alternative melody decorates the chorus chords before an impassioned climactic vocal phrase leads to a ringing keyboard ostinato. This finally climaxes proper into a keyboard string statement of the chorus tune. The effect is musically quite stirring.	35 17
On Every Street	Dire Straits (Mark Knopfler) (1991)	2.51 – end of track	A sax statement of the verse interlude theme before a cadence to finish the song.	The interlude theme picked on a solo guitar preceding a gradual build up by the entire band, climaxing in an unexpectedly quick tempo and the pedal steel guitar re-iterating a motif over the whole ensemble. It is a study in production and layering of sound.	15 7 19B
God Only Knows	The Beach Boys (Brian Wilson / Tony Asher) (1966)	1.04 – 1.28	Either a contrasting bridge section or an instrumental over the verse accompaniment.	A completely unexpected four bar syncopated figure of customarily 'Wilson – layered' block chords. This leads straight into a polyphonic vocalised arrangement of the verse with contrasting melodies. This would have been unheard of even in the Beatles recordings.	31 35 1
The Song Remains the Same	Led Zeppelin (1973)	2.18 – 2.34	A sung bridge or chorus, some contrasting material	A return to the ferocious tempo from the introductory passage, with some suitable vocal ad libs and guitar flourishes to propel the already exhilarating drum and bass accompaniment. An example of how musicians' interplay can augment a song's effect on the listener.	3 38
Shine On You Crazy Diamond	Pink Floyd (Waters, Wright and Gilmour) (1975	3.53 – 4.31	If you haven't read the sleeve or tracklisting, one would expect the next track	The immortal guitar motif of B flat – F – G – E. It is played unaccompanied for four times independently, with a reduced gap between statements each time, resulting in the first steady tempo and 12/8 instrumental groove on	15/3 17 5

				the record, rather surprising considering 4 and a half minutes have passed.	
Let's Face the Music and Dance	Irving Berlin	The opening 20 seconds	A return to the opening phrase and a cadence in the minor key, or a modulation at the end of the eighth bar.	A modulation to the relative major key in the middle of a bar in the middle of the phrase. This betrays an untrained musician who was willing to break a rule to gain an effect. Berlin's ignorance pays off in glorious style – a subtly life affirming moment.	17
Trout Mask Replica	Captain Beefheart	The whole 4-sides	Steady beats, rhyming lyrics, tonal melodies	doing away with a steady beat, neatly rhymed lyrics and tonal melodies. Delta blues, free jazz and beat poetry, images from outside music ('play it like windshields wipers in a rainstorm)	3 35 36
Money	Pink Floyd (Roger Waters)	3.02	Continuing 7/4 time signature once Dick Parry's sax solo hands over to David Gilmour's guitar break	Shift to 4/4 via a 2 bar triplet drum fill (breaking with the pedestrian beat) for a classic guitar solo.	19B
Reelin' In The Years	Steely Dan	1.59 – 2.54	A blues rock single line guitar solo	A steadily texturally increasing folk influenced melodic guitar line, leading to a standard solo before a return to the verse on beat 3 of a bar – typically awkward for this band……..	10
Tunnel Of Love	Bruce Springsteen	3.40 – 4.16	Chorus fade out	An extra 16 bar melodic 'episode', with a new chord sequence, led by chorus vocals doubled with lead guitar, greatly enhancing the return to the main chorus idea which, co-incidentally, fades out.	5 17
Yours Is No Disgrace	Yes	0.39 – 1.25	A way out of the disjointed drum syncopation against the organ chords and guitar/bass riff	A 5 beat snare fill leading to a 4/4 groove underpinning a distinctive keyboard melodic sequence, delightfully decorated on its second statement by virtuosic guitar arpeggios before winding its way to another change in structure	19B 5 15

She Loves You	The Beatles (Lennon & McCartney)	2.16 – 2.20	A final major triad chord in vocal harmony	The bass guitar plays the G root note, while the 6th note (E) is added to the B and D to create G6 – a harmonic development for the RnB rooted Beatles	1 5
Day Tripper	The Beatles (Lennon & McCartney)	1.21 – 1.42	A blues type solo over the basic 12 bar chord progression	A transposed version of the initial guitar riff over a pedal dominant bass, joined by vocal harmonies as the guitar improvises more loosely, resulting in a mighty crescendo to a 2 bar tambourine shake over the original riff in the tonic key. The longest perfect cadence in rock and roll thus far.	13 15 20
We Can Work It Out	The Beatles (Lennon & McCartney)	0.46 – 0.51	A 2 bar vocal rest while the flattened seventh chord is strummed.	A unique 4 bar descending accompaniment in ¾ time, pre-dating progressive rock by 4-5 years!	19 17
Paperback Writer	The Beatles (Lennon & McCartney)	1.38 – 1.50	A drum fill or a lead vocal insert	The music stops yet again to layer the title line in a polyphonic texture, the riff and drums re-enter, propelled by a four note clarion call on McCartney's bass to herald the coda fade out	3 7
A Day In The Life	The Beatles (Lennon & McCartney)	1.39 – 2.16	Verse 3 or a chorus of some kind	Lennon's controversial line 'I'd love to turn you on' precedes a cacophony of atonal noise rising upwards throughout a full orchestra, working as a transition between Lennon's verse two and McCartney's bridge. As an eight year old I wondered 'what the heck is this?' A legendary wow moment.	38 22
Tutti Frutti	Little Richard	0.01 – 0.05	A guitar, drum or full band intro statement or melody	A high tenor, 2 bar nonsense syllable scat melody on 2 differing pitches. Arguably popular recorded music's first masculine 'shout' – documented as life changing for people such as Paul McCartney, John	38

				Lennon, Eric Clapton and David Bowie.	
Achilles Last Stand	Led Zeppelin	0.01 -0.19 / 9.43 – 10.21	An opening guitar riff to suggest the tempo and overall character of the song	Alternating arpeggios of G minor and F minor (with varying added notes) are played by a solo guitar with considerable delay creating a sense of counterpoint and tension. The snap of the snare drum for the thumping groove changes the whole complexion of the music for the next 9 and ½ minutes before the mysterious intro returns	37 19B
Good Times, Bad Times	Led Zeppelin	Introduction	Conventional 4/4 rock beat with kick-drum on beats 1 and 3	An extraordinarily complex bass-drum pattern with an almost logic-defying level of technical skill. Opening track on the debut album, and therefore an amazing introduction to the band that would come to define 'hard rock'.	19 31
This Charming Man	The Smiths (Morrissey & Marr)	0.01 – 0.12	A four or eight bar band introduction with guitar chords setting the 'groove'	A spiky solo guitar intro, half rhythmic and half lead in character lasting 3 bars and 3 beats, the upbeat accompaniment and major chords masks the fact that the guitar melody/riff is inherently minor in key. It is, strangely, a metaphor for the Smiths' music as a whole.	2 37 15
There Is A Light That Never Goes Out	The Smiths (Morrissey & Marr)	1.00 – 1.32	A structural change, but not a shift of key	A two bar turnaround modulates us into a major key for the chorus. The superimposing of such melancholy lyrics with an apparently soaring yet evenly arched melodic phrase and high string descant makes impending death strangely uplifting….	37
Arabesque No.1	Debussy	First 12 bars	Additional rhythmic triplets in the main accompaniment once the 4 bar intro is finished	The melody is entirely in triplets as the left hand accompanies in smooth stately quavers. A very complex juxtaposition.	20 17
Once In A	Talking	The whole	The bass to follow	The two bar bass figure	

Lifetime	Heads	song	the chords in both verse and chorus.	remains for the entire piece, but is out of sync with the chorus melodic rhythm, creating what appears to be a totally different section	37 20
Like A Rollin' Stone	Bob Dylan	The first chorus	A typically 'wordy' Dylan chorus supported by rhythmic acoustic strumming	The line 'how does it feel' is echoed by a two bar organ motif (played by Al Kooper) – a revolution in folk based music – giving a great sense of space to the chorus. The focus was moving to the accompaniment…..	2 35
Hey Joe	Jimi Hendrix	0.50 – 0.55	Basic fill in from the drums before the next verse	The line 'huh – and that ain't too cool', cements the sense of understatement after murdering his wife for 'messing around with another man'. The timing of the utterance is remarkable as it feels as if there are more bars' rest. There aren't.	13 37
Hey Joe	Jimi Hendrix	2.03 – 2.10	Another statement of the central chord progression before the next verse or guitar solo.	A now legendary walking bass by Noel Redding linking the chords in a far more predominant manner. It is often imitated, but rarely bettered. The character of the music changes for those few seconds and one forgets that the material is essentially the same.	35 3
Virginia Plain	Roxy Music (Bryan Ferry)	2:04 – 2:36	Two chords and a drum fill before the final verse.	A repeated plagal cadence over a throbbing piano rhythm and an early synthesizer ostinato by Brian Eno with its timbre fluctuating in a 'futuristic' manner. It leaves the listener wondering when normality will be resumed.	3 18
Heartbreak Hotel	Elvis Presley	0.10 – 0.20	A continuation of the revolutionary male tenor range in the following bars.	The dynamics shift down and Elvis bemoans his loneliness in baritone mumbles. Never heard before……..or since?	13
The Spirit Of Radio	Rush	The instrumental intro	The basic chord pattern or 'groove' of the song to be	A persistent high melodic guitar ostinato is punctuated by a highly	1

			established	irregular and syncopated unison bass and drum melody, before the guitar joins them in a proper riff. Rare for a hit single.	19 31
Stay With Me	The Faces	The shift in tempo before the vocal entry	The vocal to enter with the quick tempo groove set by the band at the start.	The drummer signals, with a cymbal crash, for the guitarist to begin a half time 'chugging' riff, followed by bass and keyboards a bar later. The song's character is turned from boogie to 'swagger'. It epitomizes the band.	19B 5
Every Breath You Take	The Police (Sting)	The single chord piano solo.	A guitar break after the middle eight.	The guitar remains on the ostinato for the verse material, whilst a lone piano plays a solitary repeated tonic major chord in a high register, reflecting the state of the singer's mood (one would imagine). Choices like this make a difference.	37
Creep	Radiohead	0.57 – 0.58	Some kind of link into the chorus…	…but not the incredible guitar 'crunch'es coming from nowhere and in total contrast to the gentle backing track underneath the verse.	35 21
Right Off	Miles Davis	19.00 - 23.00	Continuation of the basic beat that has been ever present for the first 19 minutes	Vivid shift to a considerably different beat to underpin a blistering extended guitar work-out from John McLaughlin. One of the defining moments of jazz-rock.	19B
Gloria	Patti Smith	Introduction	A cover of Van Morrison's song	The opening cry, 'Jesus died for somebody's sins, but not mine', which, coming as it does at the beginning of the opening track on Smith's debut album signals that something very different has arrived on the scene.	35 5

Table 1: Musical 'Wows'

So What Does This Tell Us?

Perhaps the first thing we might notice about the results is that the right-hand 'what Inventive Principle can we see' column always has an entry. Further we might notice that there is no magical number '41' amongst the list. All of the musical wows, in other words, are consistent with the existing TRIZ framework of 40 Principles.

More specifically, then, we might begin to notice that not all of the 40 Principles are present in the list of examples. In fact there is quite a strong skew towards a relatively small subset of the 40. Figure 2 presents a ranked list of the Principles we could see being deployed. There are only 44 entries in the Table, and so it would be foolish to try and conclude anything definitive about the Principles that did appear. If anything, the challenge now goes out to see if it is possible to find musical wow examples that arise from other of the 40 current Principles. We will leave this topic for a future article, however, and try now to delve into a little more detail about what we might legitimately conclude from the statistically small dataset.

One aspect that seems to emerge from a helicopter-perspective view of the whole Table is that there appear to be three basic categories of 'wow':

1) wows associated with a particular moment within a piece of music
2) wows associated with the overall structure of the piece of music, and
3) wows associated with high-level shifts within or around a given genre of music

Without wishing to delve too deep into TRIZ jargon, what we have in these three categories is the standard sub-system, system and super-system view of the world – Figure 2. Thus, if we take a given individual piece of music and call it 'the system', then we can see wows associated with conflict resolutions at the system level. We can then zoom in and see wows within a piece of music ('sub-system') and wows that operate at a higher, 'super-system level – where the conflict exists between a piece of music and its prevailing surroundings.

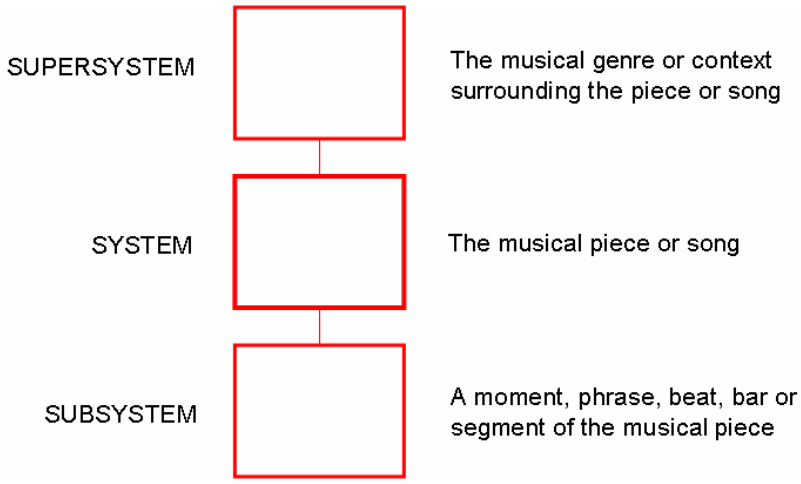

Figure 2: Sub-System, System And Super-System Level Wows In Music

Let's explore each of these three categories of 'wow' in a little more detail in order to see if there is anything we can learn about each. First of all, Table 2 presents a breakdown of how many wows in our study feature in each of the three categories.

Sub-System	20
System	20
Super-System	4

Table 2: Breakdown Of Wows Into Sub-System, System And Super-System Categories

The bias towards the sub-system and system level is not surprising given that when we are listening to a piece of music, or focus is generally 'in the moment' and not contemplating the bigger musical picture. This being said, let us now examine each of the three levels individually in a little more detail:

Sub-System Level Wows

These are 'wow' moments that occur within a particular piece of music. They tend to occur over relatively short periods – perhaps in extreme cases (like Radiohead's career-launching guitar crunches in 'Creep', or Little Richard's scream in Tutti Frutti) in just a few moments

Closer examination of the pieces that feature in this sub-system category reveals that certain Inventive Principles feature more prominently than others. The most common sub-system-level wow seems to emerge from Principles 19 ('Periodic Action' – e.g. changing the beat unexpectedly), 17 ('Another Dimension' – e.g. taking the music to an unexpected note or key), and 5 ('Merging' – where we see things like the surprising combination or layering of different musical instruments or textures). Table 3 presents a frequency-ranked list of all of the Inventive Principles that our study showed create a sub-system-level 'wow'.

Principles (decreasing frequency)	19	17,5	35,13,37,38	1,5,20,31	2,3,10,12,18,21

Table 3: Inventive Principles Creating Sub-System Level Wows

System Level Wows

These are 'wow' moments that relate to the overall structure of a piece of music. Here we are experiencing wows that may well have a longer duration (the Miles Davis composition, 'Right Off', for example clocks in at over 26 minutes, and the wow lasts over a duration of over 4 minutes within that overall 26 minute period). As can be seen from the Table, these system-level wows most often occur when a composer alters the structure of a piece from the prevailing norms. Things like putting bridges where the listener is expecting another verse, for example, are typical of this kind of system-level wow.

Closer examination of the pieces that feature in this category reveals that certain Inventive Principles feature more prominently than others. The most common system-level wows seem to emerge from Principles 10 ('Prior Action' – usually changing the sequence of a song structure) and 19 ('Periodic Action' – where, at the system level, we see several examples of unexpected shifts of pace in a song). Table 4 presents a frequency-ranked list of all of the Inventive Principles that our study showed create a system-level 'wow'.

Principles (decreasing frequency)	10,19	3,17	7,15,37	1,35,38	2,5,13,20,22,31

Table 4: Inventive Principles Creating System Level Wows

Super-System Level Wows

These are 'wow' moments that occur beyond the boundaries of a particular piece of music. Looking beyond the statistically insufficient entries in the results table and analysing the bigger picture in its helicopter-view context we can see that, unlike the earlier sub-system and system level categories, the super-system wows appear to fall into two further sub-categories. For the sake of argument, we will call these two sub-categories 'interpolative' and 'extrapolative'.

Interpolative 'wows' occur at the musical super-system level when two different existing types of music are first integrated in some way to form a third type of music. Classic examples of this kind of interpolative wow may be seen in the work of bands like The Police (integration of rock and reggae), The Byrds (country and rock), and in composers like John Cage (classical and ambient). As shown in Figure 3, the basic Principle being used when these 'wows' are created is number 5, Merging.

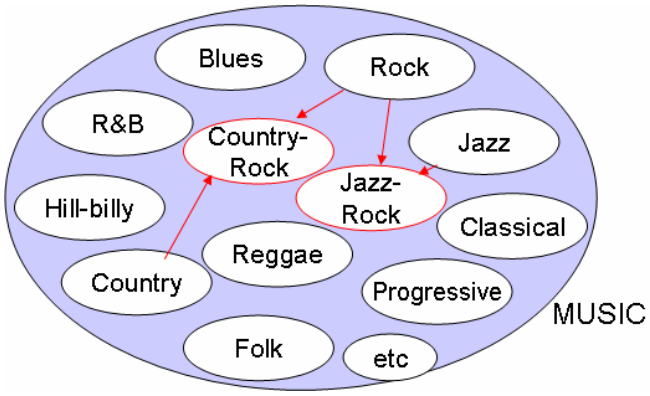

Figure 3: Interpolating Variant Of Super-System 'Wows'

Our list of wow examples features very few of these kinds of interpolative wows, despite the fact that we could see many as we delved back through musical history. In actual fact, according to Reference 3, a large part of the evolution of all forms of music occurs through the amalgamation and synthesis of existing forms. The issue here seems to be one of timing. When the Byrds released their seminal album 'Sweethearts Of The Rodeo', they effectively invented country-rock. At the time of its release, it was very definitely a 'wow'-like step into previously uncharted territory. Play it today, however, and although it still stands up as a great record, it merely sounds like 'yet another' country-rock album. The initial 'wow' has faded with time. We can see similar 'fading-wow' examples when we listen to:

- electric Bob Dylan - when he first put down his acoustic guitar and plugged-in with The Band, there were newspaper headlines 'Dylan goes electric', and cries of heresy from many in the folk genre, now it just sounds like Bob Dylan.
- Paul McCartney's bass-playing – at the time it was considered revolutionary that a bass-player should play melodies, fills and even lead runs, while again today, it just sounds like 'normal' bass.
- Disco music – the first time someone decided to put a bass-drum on every beat of a four-beat bar it was a 'wow' that created a whole new genre. Again, today, it is simply 'disco music.
- Emerson, Lake & Palmer – merger of heavy rock and classical

The point here is that these are all examples of 'wows' that have to be viewed from the perspective of their surroundings. They don't feature much in our list (in fact probably only Pink Floyd and Cole Porter still provoke some kind of a wow, and even then only in some listeners) because we never asked participants to view the pieces they chose from their historical context; rather we implicitly asked what made them go 'wow' right now.

If these 'interpolative wows' have a tendency to fade with time, the other sub-category of 'extrapolative wows' do not. Rather these types of super-system level wows don't feature much in our study because they tend to be rarer in nature. They also have a strong tendency to polarise listeners – so that what one person will describe as a 'wow', ninety-nine others will describe as the opposite of a wow. Probably the classic example of the 'extrapolative wow' is Captain Beefheart. To many people, Beefheart's 'classic' 'Trout Mask Replica' is an unlistenable cacophony. To others, though, it represents a record that even today, 35 years after its original release, packs a whole collection of wow moments. Beefheart's extrapolative trick is that he moved beyond the boundaries of 'music'. Trout Mask Replica is nevertheless very much still an example of Principle 5, 'Merging', but it sees the merging not of one type of music with another, but one type of music and something outside of music. In this case, the merger takes place between Delta Blues

music, beat poetry and surrealist/Dadaist art. Hence 'extrapolation' – as illustrated in Figure 4. Extrapolation is all about extending boundaries. These types of breakthrough innovations tend to be rare. They also tend to create a host of new opportunities for interpolating innovations downstream. Still no-one sounds quite like Beefheart, but many have earned their musical living by Merging what Beefheart did with other types of music – take Stump (Beefheart plus Indie-Rock), Devo (Beefheart plus new-wave), Pere Ubu (Beefheart plus punk/electronic) and The Residents (Beefheart plus pop-rock) as four good examples of bands who simply would not have existed without Beefheart before them.

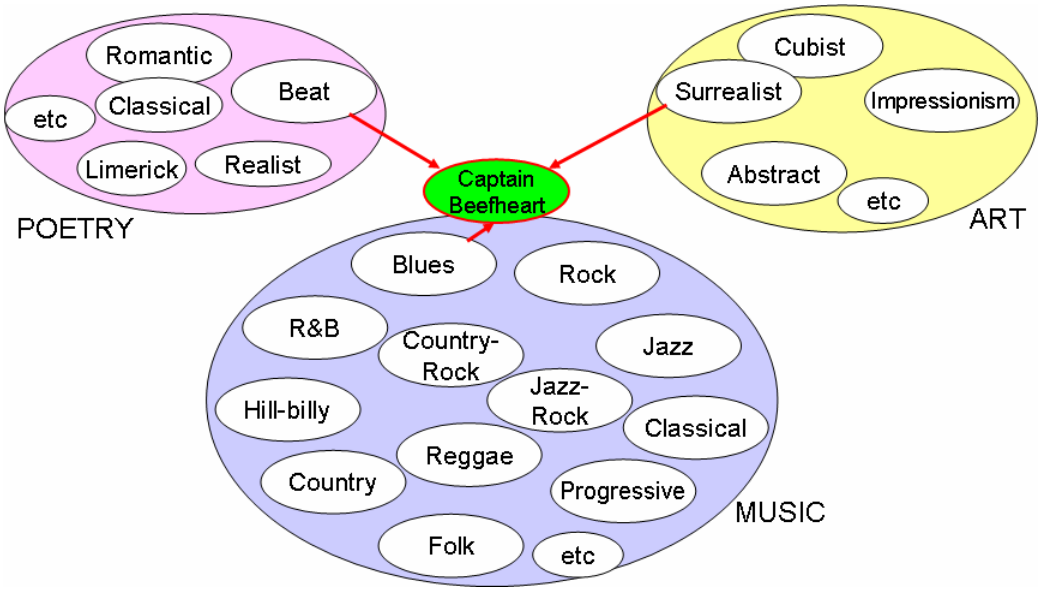

Figure 4: Extrapolating Variant Of Super-System 'Wows'

Other extrapolative wows not featured in our Table include:

- Can, a highly influential German band who brought together rock and electronics during the 1970s
- Alice Cooper – heavy rock and theatre
- Patti Smith – punk rock and literature

Closer examination of the super-system wow pieces that do feature in our study reveals that certain Inventive Principles feature more prominently than others. The most common super-system-level wow seems to emerge from Principles 5 (the already discussed 'Merging' Principle) and 35 ('Parameter Changes'). Table 5 presents a frequency-ranked list of all of the Inventive Principles that our study showed create a super-system-level 'wow', whether interpolative or extrapolative in nature.

Principles (decreasing frequency)	5,35	3,15,17,36

Table 5: Inventive Principles Creating Super-System Level 'Wows'

Summary And Conclusions

There is a very strong correlation between musical 'wow' moments and the resolution of a conflict. Typically the conflict centres on shifts away from what a listener expects to happen in a piece of music.

All of the examples we uncovered in this study can be mapped onto the existing framework of the TRIZ 40 Inventive Principles. We make no claim that these 40 Principles

are the only ones, but merely that so far they are the only 40. In fact, based on our limited number of cases, only 20 of the 40 have been mapped. 7 of these 20 Principles seem to occur with a much higher frequency than the other Principles. These seven are:

19, 17, 3, 35, 37*, 5 and 15

* interpreted here as 'Relative Change', rather than 'Thermal Expansion - as in Management TRIZ

This article has primarily been about analysis of the past. We have made no attempt to show or suggest that the Principles found in past wows can be used to systematically create future wows. It is, however, our belief that the study has uncovered certain repeatable 'wow' patterns that could be deployed in a compositional sense. The George Box statement 'all theories are wrong, but some are useful', found at the beginning of the first Design For Wow article continues to be relevant here. We will never be able to prove (nor would we ever wish to try) that the ideas presented here can systematically help composers to create future musical wows. We can say, though, that they offer at least a first step towards such a goal. We will be looking to report on some of those first steps in a future article.

References

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