

Assessing the Impact of Sky EPG Positioning on Channel Performance

A Report for Discovery

7th November 2008

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- There can be little doubt that Sky EPG positioning has a significant impact on channel performance.
- A regression analysis shows that, within all the main SKY EPG genre sections, there is a statistically significant negative correlation between a channel's performance and its position on the EPG, whereby channels further down a given genre section generally do worse than those near the top.
- We also conducted a comprehensive study of actual examples where channels changed EPG positions.
- In all the examples we analysed that involved major moves into or out of prominent positions within the Entertainment, Documentaries and Lifestyle & Culture sections of the Sky EPG, we were able to establish statistically significant impacts on channel performance.
- The transfer of the Lifestyle channels from relatively prominent positions in the upper half of the Entertainment section to the newly created Lifestyle & Culture section, on 28/02/2006, also had a very significant negative impact on their performance.
- The Lifestyle & Culture section has consistently proved to be the least popular of the major genre choice options, severely curtailing the ability of the Lifestyle channels to attract browsing viewers.

- As part of its response to Phase 2 of Ofcom's *Second Public Service Broadcasting Review*, Discovery has asked Attentional to conduct analysis to assess the likely impact of Sky EPG positioning on channel performance.
- Ofcom's *Code of Conduct on Electronic Programme Guides* requires EPG operators to give public service broadcasters "appropriate prominence". It is, however, the responsibility of the EPG operator to interpret these guidelines. Although Discovery does not have a public service remit, much of the content broadcast by its portfolio of channels can be said to have public service value, and its current lack of prominence on the Sky EPG is likely to limit viewer exposure to this content.
- Despite acknowledging that: "an active trade in EPG positions in the multichannel sector suggests that broadcasters believe their channels can increase viewing in higher EPG positions", and that: "where the benefits of public service status are open to a wide range of providers, other broadcasters could value a prominent slot more highly than those that currently occupy them",¹ Ofcom has so far failed to conduct detailed research into the likely impact of EPG positioning on channel performance. Indeed, Ofcom openly acknowledges that it "has not fully investigated the effects of channels moving within EPGs, and changes in viewing figures may be the result of numerous factors, which may vary depending on the facts of each case".²
- While it is undoubtedly true that trying to isolate the viewing impact of EPG changes from other likely confounding factors is difficult, we believe that, by combining a review of the available evidence with the appropriate statistical techniques, it is possible to reach more robust conclusions.

¹ Ofcom, *Second Public Service Broadcasting Review (Phase 2)*, p.98.

² Ofcom, *The Communications Market 2008*, p. 155.

- Attentional has extensive experience in conducting EPG change risk assessment modelling for its multichannel clients. Our approach is based on two complementary statistical analyses designed to determine what relationships can be established between a channel's EPG position and its performance. The two complementary approaches are:
 1. A regression analysis designed to determine if it is possible to establish a robust relationship between a channel's EPG position and its performance, based on current performance and EPG positioning data.
 2. A structural break analysis designed to see if, in cases where channels have changed EPG position, it is possible to observe statistically significant structural breaks in their performance, and to use this as the basis for developing a formula to predict the impact of any future positioning changes.
- As the SKY EPG is constantly changing, the regression analysis will be based on the Sky EPG from the most recent month for which we can obtain consolidated BARB audience data (September 2008).
- The structural break analysis will focus on some of the major Sky EPG positioning changes that have taken place in recent years, including the creation of the Lifestyle & Culture section during the 28/02/2006 reshuffle.

Sky EPG Positioning and Channel Performance: Regression Analysis

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Regression Analysis: Sky EPG September 2008

- The Sky EPG is changing constantly. When Sky announced that it would not be accepting any more applications for the EPG launch queue in October 2007, there was a backlog of around 100 channels and so the EPG has continued to grow as these channels gradually come on air. To this must be added numerous channel re-brands, channels closing down, a growing trade in EPG slots and general reorganisations implemented by Sky to make the EPG more efficient.
- In the midst of this continuous evolution, the September 2008 market saw a relative lull in Sky EPG activity, following a major reorganisation by Sky over the summer, and followed by a new spate of channel launches and re-brands (most notably that of UKTV's entertainment portfolio) in early October. September 2008 is therefore a good month on which to base our regression analysis of the Sky EPG.
- At the end of September 2008 there were 570 channels listed on the Sky EPG, starting with BBC1 at number 101 and ending with the Sky Customer Channel at number 999.
- These can be accessed through the All Channels option on the TV Guide page, which lists all 570 television channels ranked in ascending order by EPG number at 10 channels per EPG page, or through one of 14 genre options: Entertainment, Lifestyle & Culture, Movies, Sports, News, Documentaries, Kids, Music, Shopping, Religion, International, Gaming & Dating, Specialist and Adult.
- Of the 570 channels on the Sky EPG in September 2008, 247 were measured by BARB, but these accounted for 96% of viewing on the Digital Satellite (DSAT) platform, with the BARB measured channels in the Entertainment section of the Sky EPG (including the 5 Terrestrials) accounting for 65.5% of viewing.
- The 5 Terrestrial channels (BBC1, BBC2, ITV1, CH4 and Five) at the top of the Entertainment section (and the EPG as a whole), accounted for 40.1% of viewing. Further details are outlined in the table below.

Regression Analysis: Sky EPG September 2008

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Sky EPG Genre	EPG Number	No. of Channels	No. of BARB Measured Channels	Individuals Share of Viewing (DSAT Platform)
Entertainment	101 to 206	93	75	65.34
Lifestyle and Culture	240 to 280	38	34	2.10
Movies	301 to 333	32	26	5.13
Music	350 to 383	30	30	2.29
Sports	401 to 456	35	20	6.78
News	501 to 514	14	5	1.78
Documentaries	520 to 553	26	22	3.56
Religion	580 to 594	15	0	-
Kids	601 to 630	30	28	8.87
Shopping	640 to 683	40	4	0.11
Movies (pay-per-view) ¹	700 to 753	54	0	-
International	780 to 837	57	2	0.07
Gaming & Dating	860 to 879	15	0	-
Specialist	880 to 888	6	0	-
Adult	900 to 958	56	1	0.05
Entertainment (continued) ²	971 to 995	25	0	-
Sky Services ³	899, 970, 996 to 999	4	0	-
Total	101 to 999	570	247	96.07

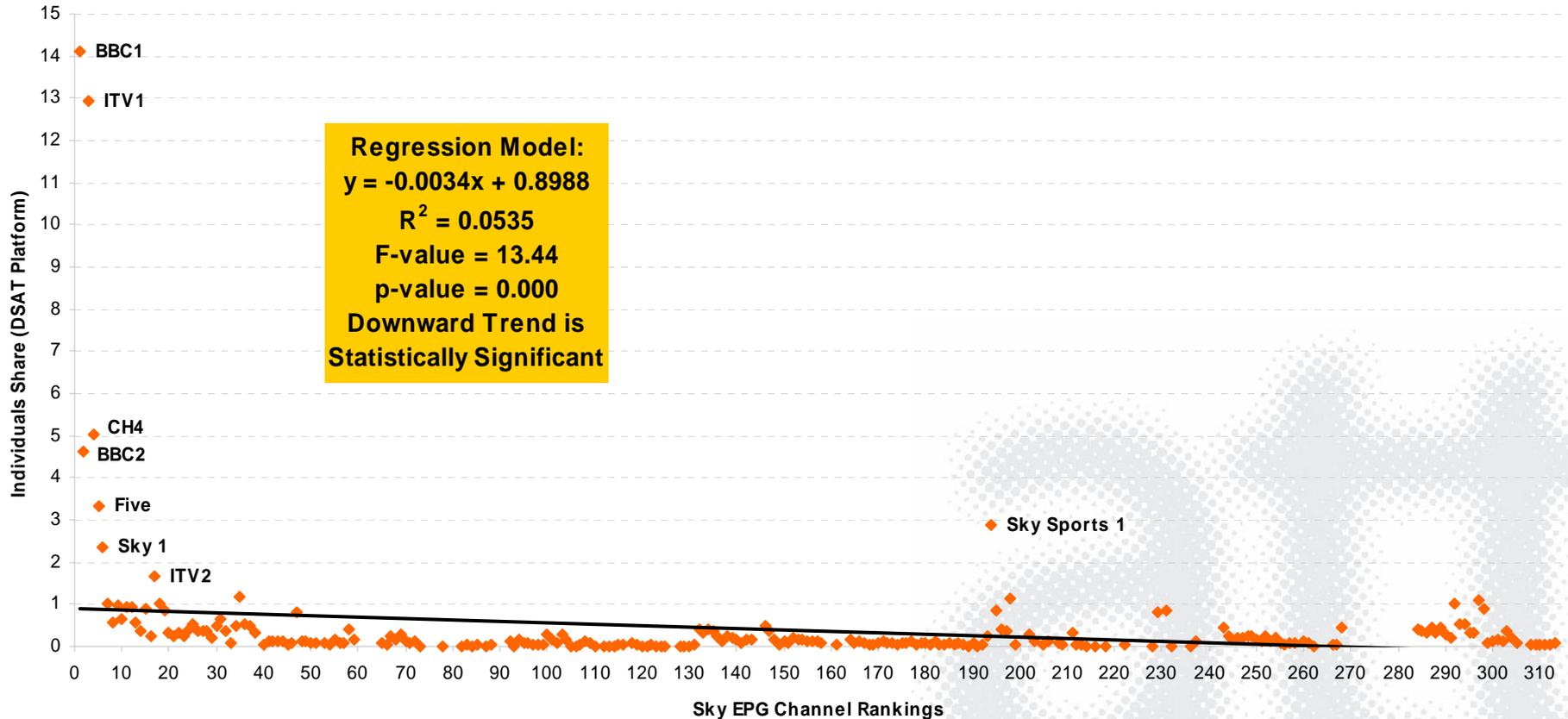
1 The Sky Box Office pay-per-view channels are appended to the Movies section if accessed through the Movies genre option, but are much further down the EPG in the All Channels option.

2 These are largely the regional variants of the terrestrial channels and are appended to the Entertainment section if accessed through the Entertainment genre option, but are much further down the EPG in the All Channels option.

3 These are channels like the Sky Customer Channel that are only listed in the All Channels option.

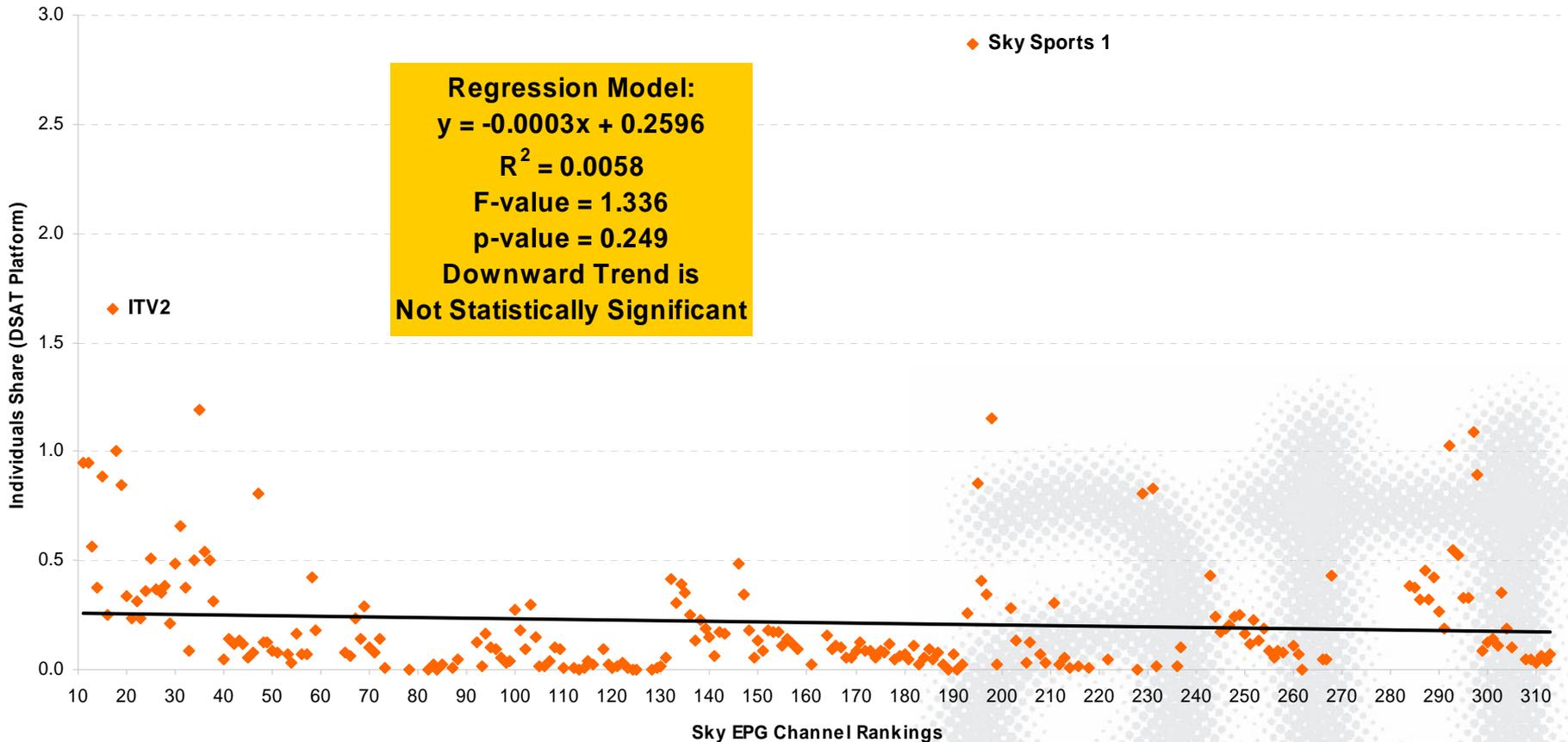
Regression Analysis: Sky EPG September 2008

- Focusing on the top eight Sky EPG genres in terms of viewing (Entertainment, Lifestyle and Culture, Movies, Sports, News, Documentaries, Kids and Music) as a group, and plotting the relationship between share of viewing and EPG position (based on channel rank to account for discontinuous EPG numbering), does indeed suggest that there is a negative correlation between EPG positioning and channel performance, with channels further down the EPG doing worse.



Regression Analysis: Sky EPG September 2008

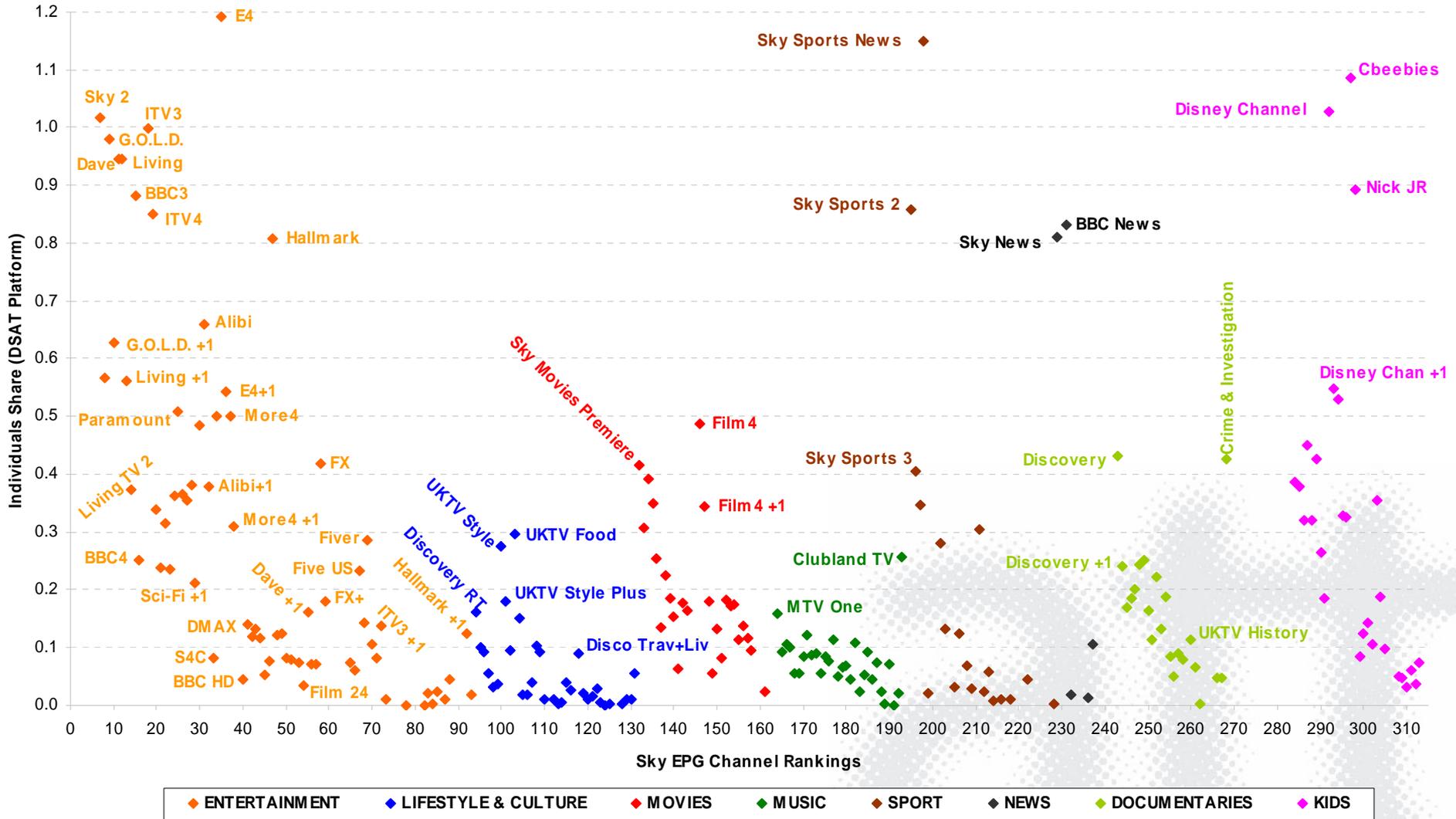
- On the other hand, it is clear that this trend is being driven by the exceptional performance of the channels (most notably the Terrestrials) on the first page of the Sky EPG, and if we exclude the first 10 channels (i.e. page 1 of the Sky EPG – All Channels) the relationship collapses.



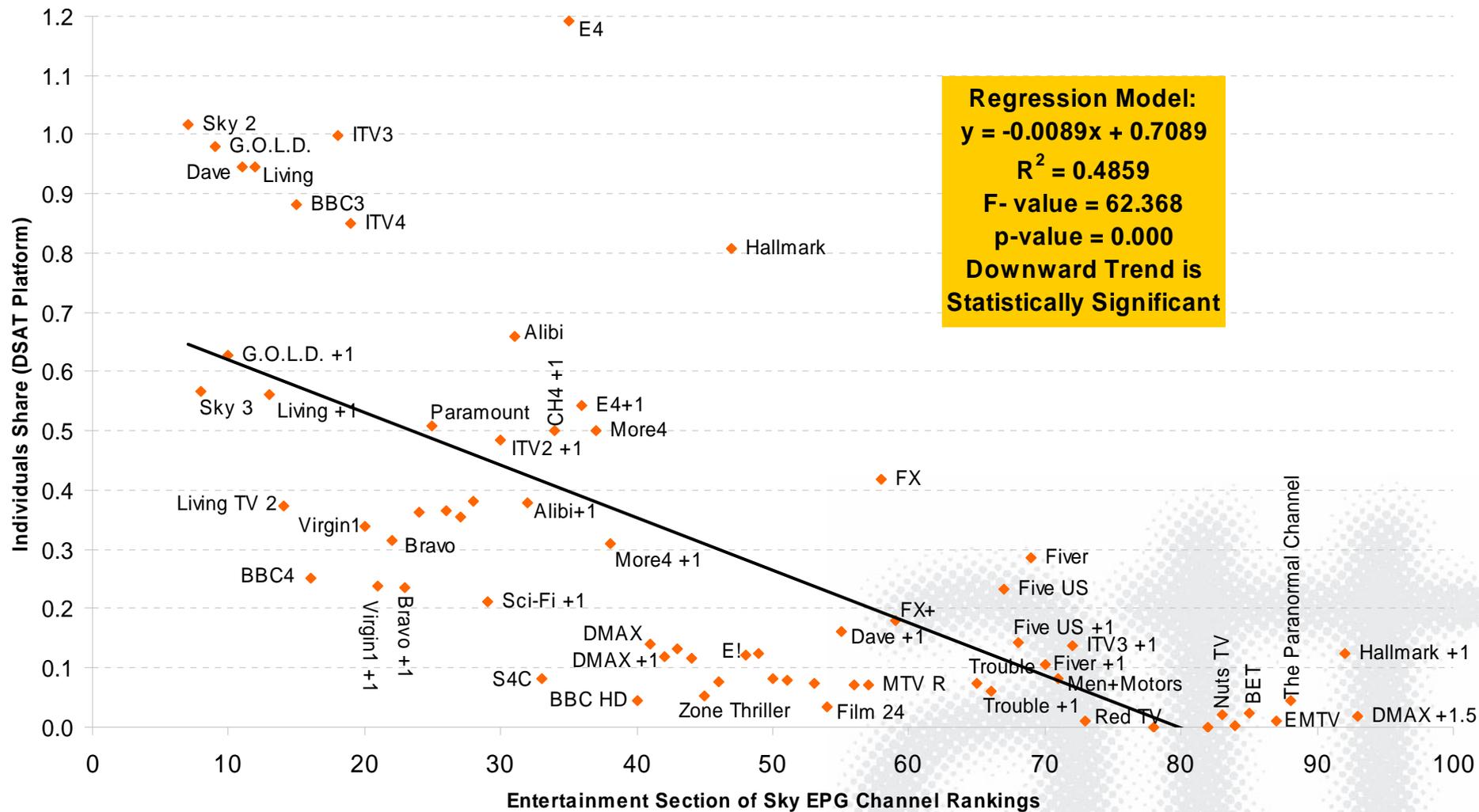
- It is helpful to illustrate this with some examples.
- The average Individuals (DSAT Platform) Share of the channels in the Entertainment section of the Sky EPG, excluding those on the first page, is actually lower than that of those in the Kids section 191 channel ranks further down (0.30 vs. 0.32 respectively), while the average Individuals Share of the channels in the Music section is significantly lower than that of those in the Documentaries section 50 channel ranks further down (0.08 vs. 0.16 respectively).
- This does not mean, however, that EPG positioning (other than on page 1 of the EPG) isn't an important factor in determining a channel's performance.
- What it does tell us is that looking at the EPG as a whole is not a particularly helpful approach, and is likely to obscure any underlying relationship between EPG positioning and channel performance resulting from the capture of EPG browsing viewers.
- Indeed, given the sheer size of the Sky EPG it is very unlikely that viewers regularly use the All Channels option as a browsing tool, and are far more likely to select one of the genre options instead.

- Additionally segmenting our data by EPG genre and excluding the most extreme outliers (BBC1, BBC2, ITV1, CH4, Five, Sky1, ITV2 and Sky Sports 1, whose performance is much less likely to relate to EPG positioning), does indeed provide a clearer picture of how EPG positioning is likely to relate to channel performance.
- As can be seen in the figure below, the beginning of each genre section is marked by a peak in performance, followed by a decline and then a surge at the start of the next genre section.
- This suggests that viewers do generally select a genre option first before browsing through the EPG, and that channels at the top of each genre section tend to do better than those further down.
- This is confirmed by a separate regression analysis of each genre section (excluding News, for which there were only 5 BARB measured channels).
- With the exclusion of only another two outliers (Clubland TV at the bottom of the Music section and the Crime & Investigation Network at the bottom of the Documentaries section), there was a statistically significant negative correlation between EPG positioning and channel performance for each of the seven genre sections we tested.

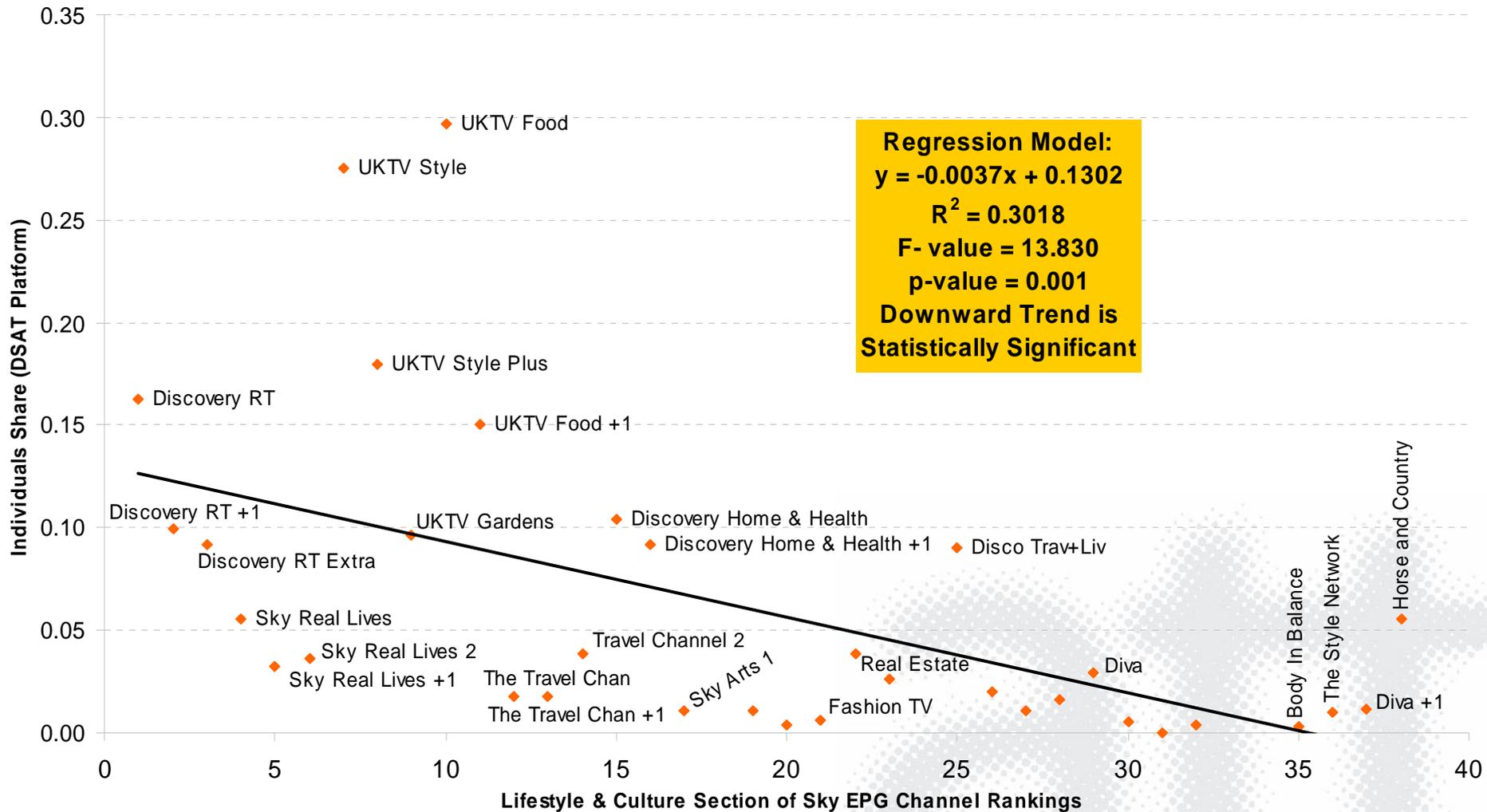
Regression Analysis: Sky EPG September 2008



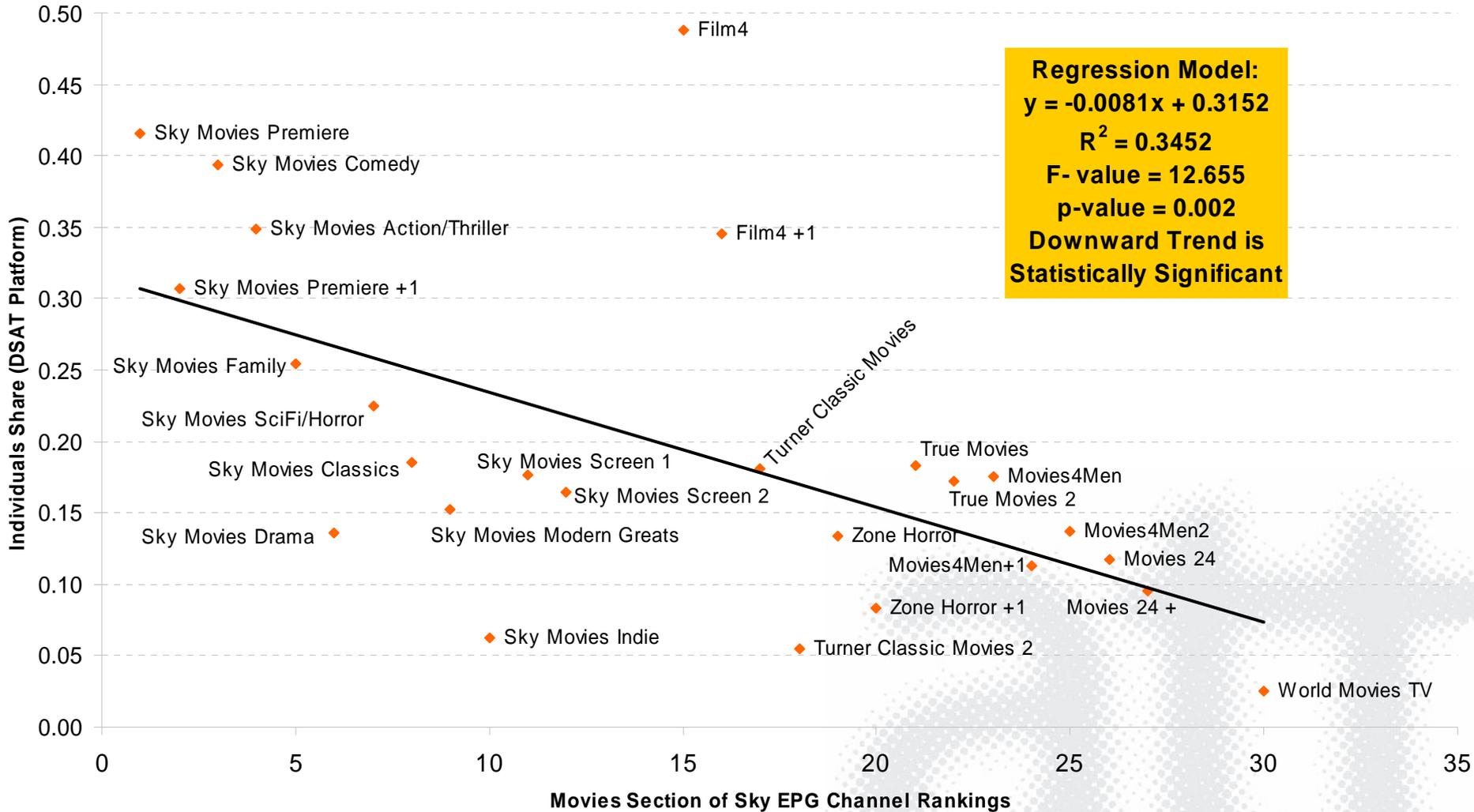
Regression Analysis: Entertainment Section of Sky EPG September 2008



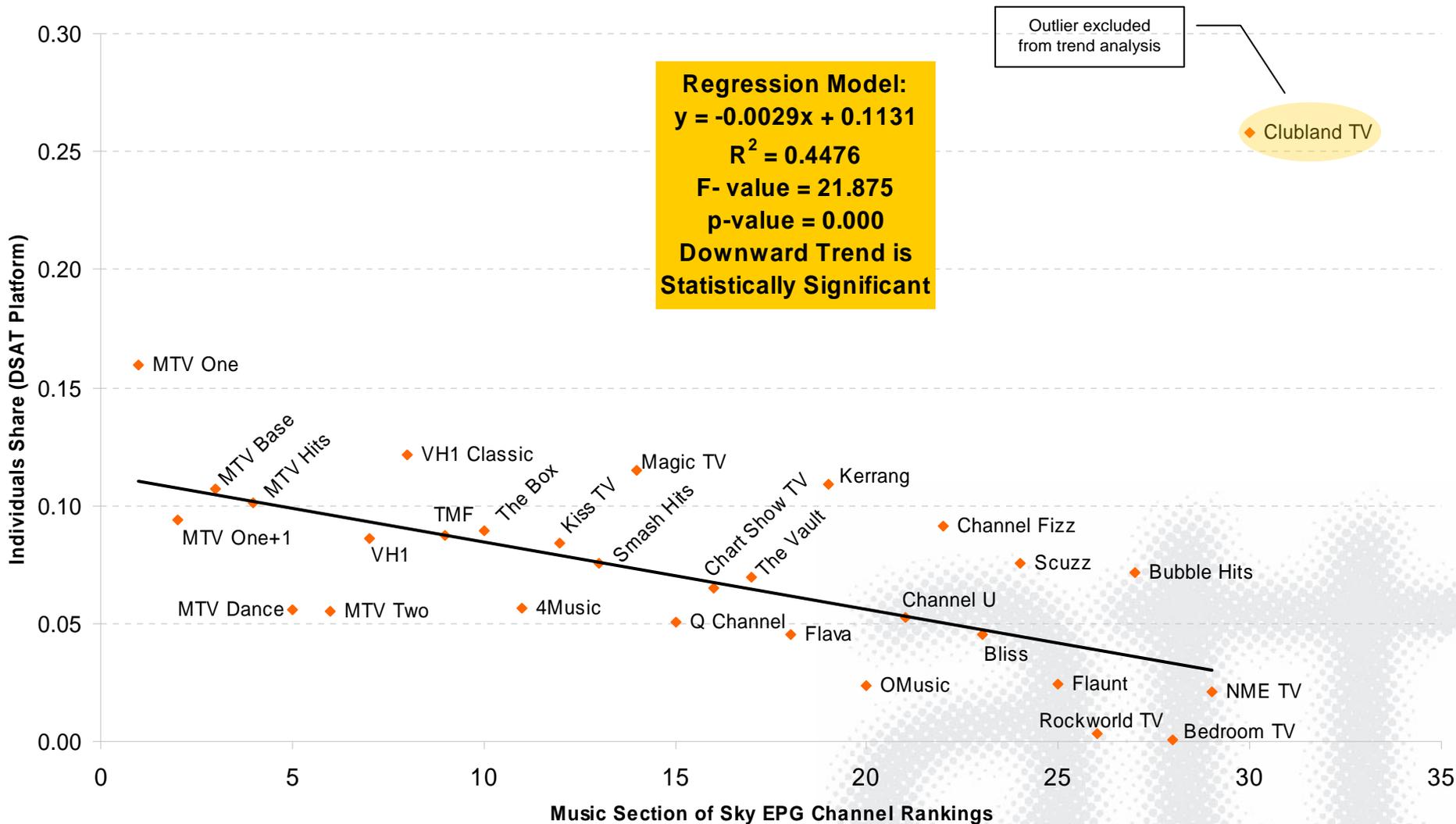
Regression Analysis: Lifestyle & Culture Section of Sky EPG September 2008



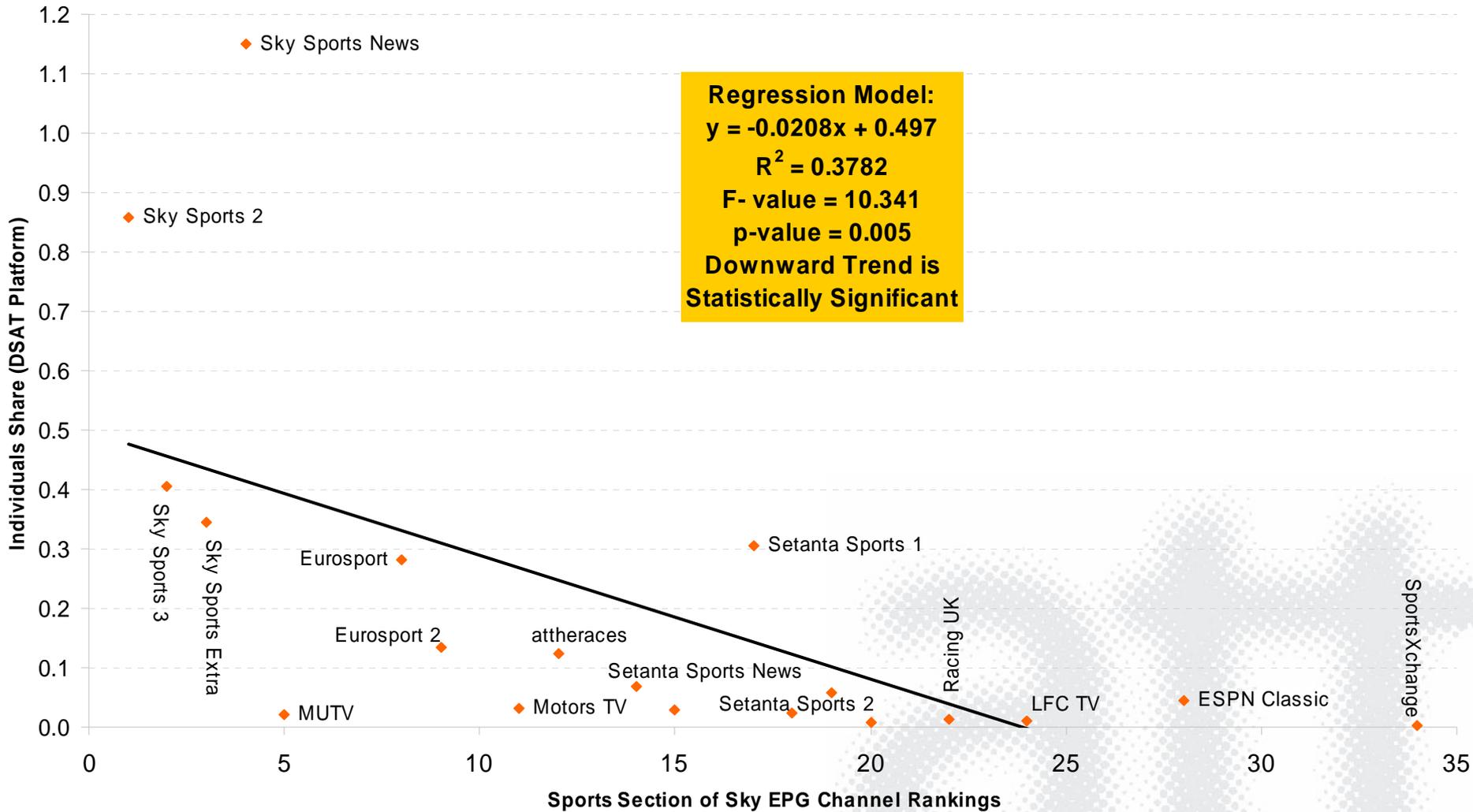
Regression Analysis: Movies Section of Sky EPG September 2008



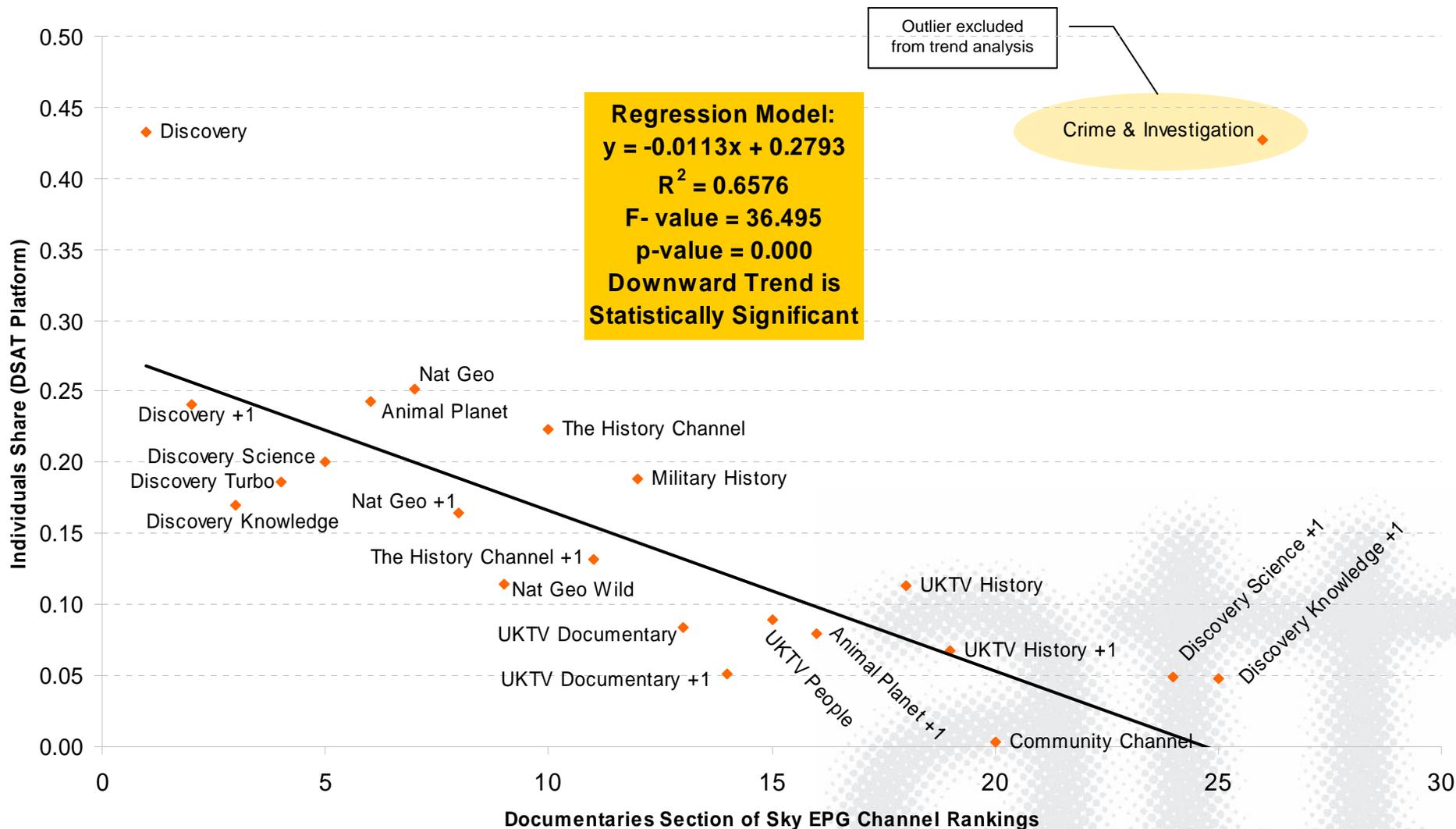
Regression Analysis: Music Section of Sky EPG September 2008



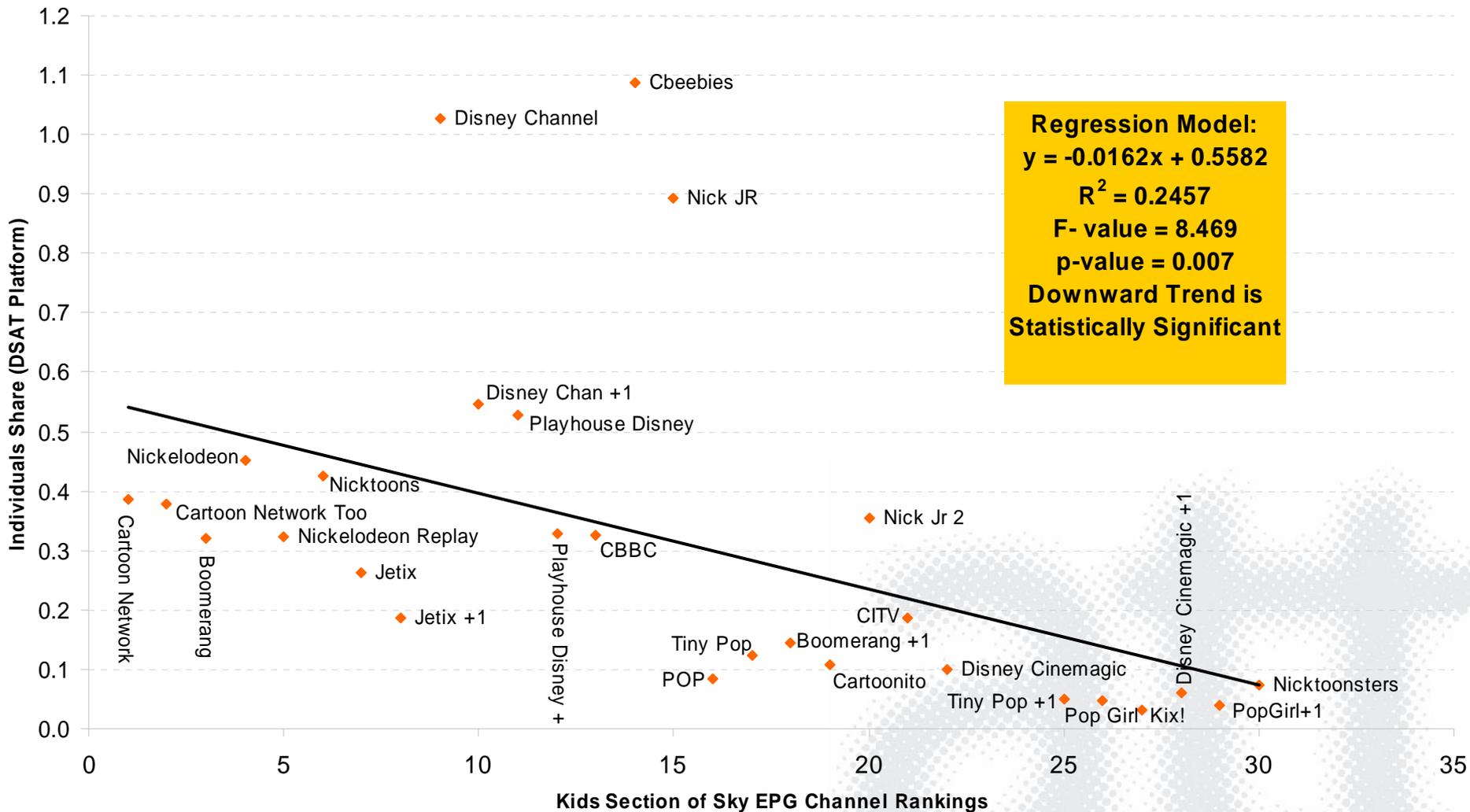
Regression Analysis: Sports Section of Sky EPG September 2008



Regression Analysis: Documentaries Section of Sky EPG September 2008



Regression Analysis: Kids Section of Sky EPG September 2008



- Our regression analysis shows that, within all the main SKY EPG genre sections, there is a statistically significant negative correlation between a channel's performance and its position on the EPG, whereby channels further down a given genre section generally do worse than those near the top.
- This is certainly a strong piece of evidence to support the thesis that, through the capture of browsing viewers, EPG positioning does have a significant impact on channel performance.
- On the other hand, it must be acknowledged that a channel's performance is also going to be strongly influenced by its brand image, the quality, uniqueness and mass appeal of its programming and, not least, whether it is free-to-air or only available as part of a basic or higher-value Sky channel package. There are certainly numerous examples where channels further down a given genre section do better than those further up.
- Taking this to extremes, one could argue that the results of our regression analysis are simply a product of the fact that, as a general rule, channel's further down a given genre section of the Sky EPG have mediocre low budget schedules, and that this, rather than their EPG positioning, explains their poor performance.

- While not necessarily implausible, this does not explain why a channel like ITV3+1 on page 8 of the Entertainment section has an audience that is only 14% the size of ITV3's on page 2, while Living+1 on page 2 has an audience that is 59% the size of Living's, just above it on the same page.
- The fact is that EPG positioning does have a significant impact on channel performance, but to establish more robust causal links we must find a way of accounting for the other confounding factors that are likely to influence a channel's viewing levels.
- This could be done, for example, by segmenting our data further to reflect underlying performance parameters, like high versus low content appeal, or high versus low channel budgets.
- The best way to do this, however, is to study actual examples where channels have changed EPG positions to see if it is possible to establish statistically significant causal links between positioning changes and channel performance. As we are comparing the same channels before and after a given EPG change, this eliminates many (though not all), of the confounding influences.
- This is what we turn to in the next section.

Sky EPG Positioning and Channel Performance: Structural Break Analysis

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Structural Break Analysis: Methodology

- Our structural break analysis is based on identifying actual Sky EPG positioning changes and comparing the daily channel shares (Individuals Share on the DSAT Platform) in the 6 weeks before and after a given EPG change has taken place.
- The choice of a six-week period either side of an EPG change is a compromise between ensuring that we have enough data points to establish that any observed differences are significant and persistent, whilst minimising the possibility of other structural factors (like significant scheduling changes) coming into play. Where such significant confounding factors have, nevertheless, coincided with an EPG change, we have factored this into our interpretation of the results.
- As daily channel shares can be highly variable, any observed differences between the pre- and post-EPG change averages need to be tested for statistical significance, to rule out the possibility that these may simply be a product of the underlying variances in the data. This is done using an independent sample t-test.
- While a t-test can tell us if there is a statistically significant difference between the average of the daily channel shares six weeks before, versus those six weeks after, an EPG change, it is important to consider the possibility that this may be the result of an underlying time trend in the channel share time-series rather than a step change at the time of the EPG change. This would be the case, for example, if there was a consistent rise or fall in a given channel's daily viewing share over the 12-week period in question.

- Nor does the presence of a significant time trend necessarily rule out the existence of a step change (i.e. structural break) at the time of an EPG change. Indeed, if a time trend is moving in the opposite direction to a step change (e.g. an upward trend with a downward step change) it is possible that an independent sample t-test would fail to detect any significant difference, as the pre- and post-EPG change channel share averages could potentially be very similar.
- As a result, we have also conducted a regression based structural break test that combines a time trend with a dummy variable to test for any significant step changes at the time of a given EPG change. This is designed to account for any underlying time trends, where present.
- In the majority of the EPG reshuffles we analysed, no significant time trends were present and the difference between the pre- and post-EPG change channel shares (if it proved statistically significant) represented the full impact of the reshuffle.
- The Sky EPG reshuffles we have analysed are summarised in the tables below.

Structural Break Analysis: Sky EPG Reshuffle Summary

Reshuffle Type	Channel Name	Sky EPG Move	Position Change (EPG Channel Ranks)	Position Change (EPG Pages)
Entertainment / Lifestyle & Culture Reshuffle (28/02/2006)	Discovery Real Time/ RT+1	133/134 to 250/251	28 to 71; down 43	3 to 8; down 5
	Real Time Extra	135 to 252	30 to 73; down 43	3 to 8; down 5
	Sky Travel/Travel +1	139/140 to 253/254	32 to 74; down 42	4 to 8; down 4
	Sky Travel Extra	141 to 255	34 to 76; down 42	4 to 8; down 4
	UKTV Style/Style+1	142/143 to 256/257	35 to 77; down 42	4 to 8; down 4
	UKTV Style Gardens	144 to 258	37 to 79; down 42	4 to 8; down 4
	UKTV Food/Food +1	145/146 to 259/260	38 to 80; down 42	4 to 8; down 4
	Travel Channel/TC +1	148/149 to 261/262	41 to 82; down 41	5 to 9; down 4
	Discovery Home & Health/H&H +1	154/155 to 264/265	44 to 84; down 40	5 to 9; down 4
	Artsworld	157 to 267	46 to 86; down 40	5 to 9; down 4

Notes - As Sky EPG numbering is not continuous we have used channel ranks as a way of gauging the actual size of any given channel reshuffle.

- There are 10 channels per SKY EPG page.

- In the table above the channel ranks and EPG pages are based on the entire Sky EPG as the 28/02/2006 marked the creation of the *Lifestyle & Culture* section and so these moves, unlike the subsequent ones in our analysis, do not represent reshuffles within an established SKY EPG genre section.

Structural Break Analysis: Sky EPG Reshuffle Summary

Reshuffle Type	Channel Name	Sky EPG Move	Position Change (Genre Based EPG Channel Ranks)	Position Change (Genre Based EPG Pages)
Channel 4 Entertainment Reshuffle (20/08/2007)	More4	140 to 138	39 to 37; up 2	No change at 4
	More4 +1	172 to 139	64 to 38; up 26	7 to 4; up 3
Virgin Media Entertainment Reshuffle (20/02/2008)	Virgin 1/Virgin 1 +1	153/154 to 121/122	49 to 20; up 29	5 to 2; up 3
	Bravo/Bravo+1	121/122 to 123/134	20 to 22; down 2	2 to 3; down 1
	Challenge	124 to 125	23 to 24; down 1	No change at 3
	Challenge+1	125 to 153	24 to 49; down 25	3 to 5; down 2
	Bravo2	123 to 154	22 to 50; down 28	3 to 5; down 2
ITV Entertainment Reshuffle (31/03/2008)	ITV2+1	184 to 131	72 to 30; up 42	8 to 3; up 5
	Men & Motors	131 to 184	30 to 72; down 42	3 to 8; down 5
Viacom Entertainment Reshuffle (07/04/2008)	MTVR	201 to 161	84 to 57; up 27	9 to 6; up 3
	Paramount Comedy 2+1	200 to 160	83 to 56; up 27	9 to 6; up 3

Notes - The ITV Entertainment reshuffle has been widely reported as taking place on the 17/03/2008, but did not, in fact, occur until the 31/03/2008.

- To test for possible cross-promotional impacts between primary channels and their time-shifted counterparts, they are treated as separate channels for instances where they were split up or brought together within the Sky EPG, and as a single channel where they were moved as a group.

Structural Break Analysis: Sky EPG Reshuffle Summary

Reshuffle Type		Channel Name	Sky EPG Move	Position Change (Genre Based EPG Channel Ranks)	Position Change (Genre Based EPG Pages)
Discovery Entertainment Reshuffle (31/03/2008)		DMax	155 to 144	51 to 41; up 10	6 to 5; up 1
		DMax+1	206 to 145	89 to 42; up 47	9 to 5; up 4
Discovery Documentaries Reshuffle (07/04/2008)		Discovery Animal Planet	524 to 525	5 to 6; down 1	No change at 1
		Discovery Animal Planet +1	525 to 535	6 to 16; down 10	1 to 2; down 1
		Discovery Science	535 to 524	16 to 5; up 11	2 to 1; up 1
Discovery Lifestyle & Culture Reshuffle	(01/04/2008)	Discovery Real Time	No change at 250	No change at 1	No change at 1
		Discovery Real Time +1	251 to 264	2 to 15; down 13	1 to 2; down 1
		Discovery Home & Health	264 to 252	15 to 3; up 12	2 to 1; up 1
	(21/07/2008)	Discovery Real Time	No change at 250	No change at 1	No change at 1
		Discovery Real Time +1	264 to 251	15 to 2; up 13	2 to 1; up 1
		Discovery Home & Health	252 to 264	3 to 15; down 12	1 to 2; down 1
A&E Documentaries Reshuffle (28/07/2008)		Crime & Investigation Network	531 to 553	12 to 26; down 14	2 to 3; down 1

- The Sky EPG reshuffle of 28/02/2006 marked a major overhaul of the EPG that included the creation of two new genres "Lifestyle & Culture" and "Gaming & Dating" to accommodate the growing number of dating and Lifestyle channels that were swelling the ranks of the Entertainment section.
- Before the move, the principal Lifestyle channels held relatively prominent positions in the middle to upper-middle ranks of the Entertainment section, with the Discovery Real Time channels at the bottom of page 3, the Sky Travel and UKTV Style/Food/Garden channels on page 4 and the Travel Channel, Discovery Home & Health and Artsworld on page 5.
- As part of the reshuffle, they were all moved to the top of the Lifestyle & Culture section in the same order they had occupied in the Entertainment section.
- On the plus side, this gave them a prominent position on the first two pages of the new section, notably Discovery Real Time, which had the 'gatekeeper' position at the top of the first page.
- On the down side, there was the possibility that the new Lifestyle & Culture section would not prove a popular first choice with EPG browsing viewers and, in terms of the EPG as a whole, the Lifestyle channels were now up to 5 pages further down, greatly reducing their capacity to capture EPG browsing viewers.
- As can be seen in the table below, our structural break analysis confirms that the latter was indeed the case, supporting the thesis that the Lifestyle & Culture channels were heavily reliant on their ability to capture EPG browsing viewers; an ability that was severely curtailed when they were moved from their relatively prominent positions in the Entertainment section to the new Lifestyle & Culture one.

Structural Break Analysis: Entertainment / Lifestyle & Culture Reshuffle (28/02/2006)

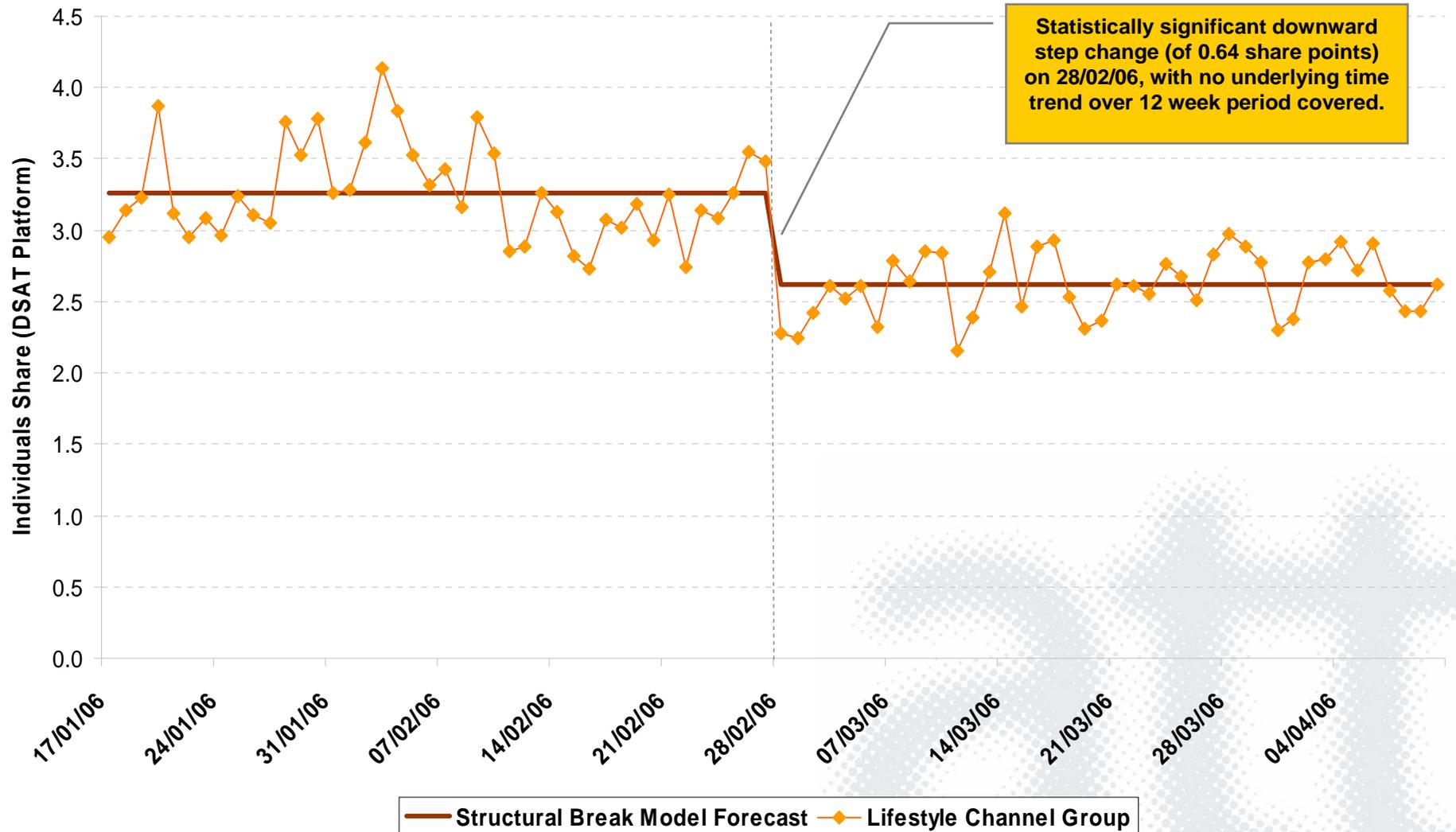
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Channel Name	Position Change (EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
Discovery RT/ RT+1	3 to 8; down 5	0.883	0.677	-0.206	-23%	6.00	0.00	Yes	No	Yes	Yes
Real Time Extra	3 to 8; down 5	0.172	0.156	-0.016	-10%	1.42	0.16	No	No	No	No
Sky Travel/Travel +1	4 to 8; down 4	0.193	0.149	-0.044	-23%	4.22	0.00	Yes	No	Yes	Yes
Sky Travel Extra	4 to 8; down 4	0.087	0.064	-0.023	-26%	3.28	0.00	Yes	Yes (downward)	No	Inconclusive
UKTV Style/Style+1	4 to 8; down 4	0.689	0.629	-0.060	-9%	2.04	0.04	Yes	No	Yes	Yes
UKTV Style Gardens	4 to 8; down 4	0.188	0.111	-0.078	-41%	6.46	0.00	Yes	Yes (downward)	No	Inconclusive
UKTV Food/Food +1	4 to 8; down 4	0.474	0.402	-0.072	-15%	3.46	0.00	Yes	No	Yes	Yes
Travel Channel/TC +1	5 to 9; down 4	0.094	0.078	-0.016	-17%	1.97	0.05	Yes	Yes (downward)	No	Inconclusive
Discovery H&H/H&H +1	5 to 9; down 4	0.438	0.328	-0.109	-25%	5.09	0.00	Yes	No	Yes	Yes
Artsworld	5 to 9; down 4	0.044	0.026	-0.018	-40%	2.65	0.01	Yes	No	Yes	Yes
Total	-	3.263	2.620	-0.644	-20%	10.3	0.00	Yes	No	Yes	Yes

Note: The EPG changes for which we able to establish statistically significant viewing impacts have been highlighted in yellow.

- The first thing to note is that all of the 10 Lifestyle channels we analysed (treating primary and time-shifted channels as a single entity), showed a drop in their Individuals Share on the DSAT Platform following the reshuffle. Discovery Real Time lost the most in absolute terms (down 0.206 share points, equivalent to 23% of its pre-change share), although some of the smaller channels were down more in percentage terms.
- On the other hand, due to the high variance nature of the underlying datasets, we were only able to establish that these performance drops were statistically significant in 6 out of the 10 cases. This does not mean that the remaining four channels weren't negatively effected - in all likelihood they probably were - but we were unable to establish this under the standard thresholds of statistical significance. Indeed, 3 of the 4 channels showed statistically significant drops under the t-test, but did not pass the significance threshold for the structural break test and so have been labelled as 'Inconclusive' overall.
- Crucially, however, all of the larger channels showed statistically significant drops under both tests, and if we analyse our 10 channels as a single group, the negative impact becomes highly significant.
- The disastrous impact of the reshuffle can best be appreciated by plotting the forecast from our structural break model against the actual daily shares of our Lifestyle channel group, which we have done below.

Structural Break Analysis: Entertainment / Lifestyle & Culture Reshuffle (28/02/2006)



Structural Break Analysis: Entertainment / Lifestyle & Culture Reshuffle (28/02/2006)

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- The 10 channels in our Lifestyle group had a combined loss of 0.64 share points, falling from an average of 3.26 in the 6 weeks before the reshuffle to 2.62 in the 6 weeks after (down 20%).
- It is also noteworthy that the continued proliferation in the number of channels on the Sky platform, and resulting audience fragmentation, mean that there has been little hope of a longer term recovery over the last two and a half years.
- Indeed, the 34 BARB measured channels that currently occupy the Lifestyle & Culture section only managed an Individuals Share of 2.1 in September 2008, an average of 0.062 per channel, the lowest channel average among the top eight Sky EPG genres (i.e. Entertainment, Lifestyle & Culture, Movies, Sports, News, Documentaries, Kids and Music).



Structural Break Analysis: Channel 4 Entertainment Reshuffle (20/08/2007)

- Moving on to the Channel 4 Entertainment reshuffle of 20/08/07, this constituted a major move by More4 +1 from page 7 to page 4 of the Entertainment section (up 26 channel ranks), putting it directly below More4.
- As can be seen below, the impact on More +1 was dramatic, with its share more than doubling from an average of 0.097 to 0.207 (up 0.109 share points, equivalent to 112% of its pre-change share).

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
More4	No change at 4	0.348	0.386	0.038	11%	-1.32	0.19	No	No	No	No
More4 +1	7 to 4; up 3	0.097	0.207	0.109	112%	-6.77	0.00	Yes	No	Yes	Yes

- It may well be that the More 4 +1 audience gained an additional uplift, beyond that attributable to its three-page rise up the EPG, by also being positioned directly below its primary channel.
- The rationale behind this hypothesis is that a primary channel is likely to act as a kind of advertiser for the content of its time-shifted counterpart, provided they are next to (or at least very close to) each other on the EPG.

- To illustrate this with an example, if a viewer browsing the Sky EPG came across More4, where *Grand Designs* was just finishing, and this is something they would consider watching, they would now immediately come across it just about to start on More4 +1, thus increasing their probability of committing to the programme. Before the reshuffle, however, they would not have encountered More4 +1 for another 3 pages, and even if they got that low down the EPG without choosing another programme, their initial interest in *Grand Designs* may well have waned by then, further reducing their probability of choosing the programme.
- We will come back to this hypothesis as we analyse relevant examples in subsequent reshuffles.
- Finally, it is also worth noting that the closer EPG association with its time-shifted variant does not appear to have had a negative impact on More4's share of viewing. There is certainly no evidence of any direct competition between More4 +1 and its primary counterpart resulting from the reshuffle. In fact, there is a slight (though not statistically significant) increase in More4's audience share over the period in question.

Structural Break Analysis: Virgin Media Entertainment Reshuffle (20/02/2008)

- All but one of the channels involved in Virgin Media's 20/02/2008 reshuffle of its Entertainment portfolio on the Sky EPG can be associated with statistically significant viewing impacts.
- Challenge is the exception, with no sign that the split from its time-shifted counterpart (which was moved 2 pages further down the EPG) had a significant impact on its performance. This is further evidence that time-shifted channels do not compete with their primary counterpart, even when they are positioned next to each other on the EPG.

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
Virgin 1/Virgin 1 +1	5 to 2; up 3	0.266	0.582	0.316	119%	-12.00	0.00	Yes	No	Yes	Yes
Bravo/Bravo +1	2 to 3; down 1	0.506	0.413	-0.093	-18%	4.57	0.00	Yes	No	Yes	Yes
Challenge	No change at 3	0.395	0.382	-0.013	-3%	0.87	0.39	No	No	No	No
Challenge +1	3 to 5; down 2	0.305	0.137	-0.167	-55%	15.30	0.00	Yes	No	Yes	Yes
Bravo 2	3 to 5; down 2	0.218	0.107	-0.111	-51%	7.34	0.00	Yes	No	Yes	Yes

- Challenge + 1's move from near the top of page 3 towards the bottom of page 5, on the other hand, proved to be highly detrimental and resulted in a 55% drop in its viewing levels, down 0.167 share points from 0.305 to 0.137.

Structural Break Analysis: Virgin Media Entertainment Reshuffle (20/02/2008)

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- A very similar move from page 3 to 5 also resulted in a 51% drop in Bravo 2's share of viewing, falling from 0.218 to 0.107 (down 0.11 share points). It is worth noting, however, that although Bravo 2 and Challenge +1 experienced similar declines in percentage terms, Challenge +1 lost substantially more audience share in absolute terms (0.167 vs. 0.11), supporting our thesis that Challenge +1 is likely to have suffered an additional loss, beyond that solely attributable to its move down the EPG, because of the split from its primary counterpart.
- Moving in the opposite direction, Virgin1/Virgin +1's 29-place rise, from page 5 to the bottom of page 2, coincided with a very substantial boost in its performance, with its viewing share rising from 0.266 to 0.582 (a gain of 0.316 share points, equivalent to 119% of its pre-change share).
- This result must be treated with caution, however, as Virgin 1's well publicised EPG change also coincided with the equally well publicised launch of the *Sarah Connor Chronicles*, which has been one of Virgin 1's highest rating shows to date, and would undoubtedly have helped to draw a significant number of additional viewers to the channel.
- The 18% decline in Bravo/Bravo+1's share of viewing, following its relatively minor (2 place) move from the bottom of page 2 to the top of page 3, must also be treated with caution. It is more likely to be the result of direct competition from Virgin1, following its well publicised move into Bravo's old EPG slot, and should not necessarily be taken as evidence that, other things being equal, a relatively minor positioning change is likely to result in a significant viewing impact.
- For more substantial EPG changes, however, notably from the middle into the top third of the Entertainment section and *vice versa*, there is compelling evidence among the Virgin Media examples to support the thesis that channels in the top third of the Entertainment section are much more likely to attract EPG browsing viewers than those further down, resulting in significant viewing impacts.

Structural Break Analysis: ITV Entertainment Reshuffle (31/03/2008)

- The ITV Entertainment reshuffle of 31/03/2008, provides another example of the viewing impact of channels moving into the top third of the Entertainment section and *vice versa*, although the moves are more substantial than those in the preceding Virgin Media examples, with ITV2+1 moving up five pages, from near the top of page 8 to the bottom of page 3, changing places with Men & Motors, which moved into the old ITV2+1 slot.

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
ITV2+1	8 to 3; up 5	0.265	0.449	0.184	69%	-8.67	0.00	Yes	No	Yes	Yes
Men & Motors	3 to 8; down 5	0.131	0.085	-0.046	-35%	4.65	0.00	Yes	No	Yes	Yes

- As one would expect, ITV2+1 share of viewing rose by 69% following its move up the EPG, going from 0.265 to 0.449 (up 0.184 share points), while Men & Motors saw a significant 35% drop in its share, going from 0.131 to 0.085 (down 0.046 share points).
- The fact that ITV2+1 made substantially greater gains than the corresponding loss to Men & Motors (both in percentage and absolute terms), suggests that Men & Motors' viewing is driven by a core following of loyal viewers (who are less likely to be put off by an EPG change), while the broader appeal of ITV2+1's content package is likely to attract more browsing viewers in a prominent EPG position. Overall this was therefore a shrewd move by ITV.

Structural Break Analysis: ITV Entertainment Reshuffle (31/03/2008)

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- It is important to note, however, that the ITV2+1 reshuffle happened close to the time that ITV2 and ITV2+1 started broadcasting 24 hours a day on 17/03/2008, with GMTV2 transferring to ITV4, raising the possibility that this may have contributed to the boost in ITV2+1's performance. Fortunately, we were able to use ITV2's performance as a comparative benchmark, and as its share of viewing share remained stable over the period in question, we were able to rule this out as a significant confounding factor.
- Another point to note is that, although ITV2+1's move to page 3 has put it significantly closer to ITV2 on page 2, it remains 13 places further down the EPG and is therefore unlikely to have benefited from the additional gains associated with a consecutive primary/time-shifted channel pairing. This point is best illustrated with a speculative example.
- In September 2008, ITV2+1's Individuals Share on the DAST platform was of 0.48, equating to 29% of ITV2's at 1.65. Furthermore, ITV2+1's five-page rise up the EPG in March had resulted in a 0.184 share point boost, equating to 0.04 share points per page if we round upwards. Extrapolating from this trend would therefore suggest that a move one page further up to just below ITV2, would be likely to raise ITV2+1's share to about 0.52, equating to approximately 32% of ITV2's. Putting this in context, all of the time-shifted channels that were part of a consecutive primary/time-shifted channel pairing on the first three pages of the Entertainment section in September 2008 achieved well over half the audience share of their primary counterparts: G.O.L.D.+1/G.O.L.D. = 64%; Living +1/Living = 59%; Virgin1+1/Virgin1 = 70%; Bravo+1/Bravo = 75%; Paramount +1/Paramount = 72%; Sci-Fi +1/Sci-Fi = 56%.
- While one can only speculate, this does suggest that if ITV2+1 were to move up another page to just below ITV2, its share of viewing is likely to receive a far more substantial boost than that suggested by a simple extrapolation from its previous EPG reshuffle.

Structural Break Analysis: Viacom Entertainment Reshuffle (07/04/2008)

- The Viacom Entertainment reshuffle of 07/04/2008 involved MTVR and Paramount Comedy 2+1 swapping places with the Open Access channels and moving up three pages, from page 9 to page 6 of the Entertainment section. It should be noted that following this move Paramount Comedy 2+1 was still a long way below Paramount Comedy 2 on page 3.

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
MTVR	9 to 6; up 3	0.086	0.093	0.006	7%	-0.66	0.51	No	No	No	No
Paramount Comedy 2+1	9 to 6; up 3	0.062	0.067	0.005	8%	-0.64	0.52	No	No	No	No

- Although both channels made small gains following the move, they were too small to be statistically significant and could just as well have been a product of the underlying variability in their performance data.
- Given that, in all the previous examples of such significant moves within the Entertainment section we were able to establish statistically significant viewing impacts, it is interesting to note that the main difference between these and the Viacom examples is that they all involved moves into, or out of, the top four pages of the EPG, while the Viacom reshuffle is confined entirely to the lower half.
- This suggests that the probability of attracting browsing viewers drops off very significantly in the lower half of the Entertainment section, with the result that even substantial moves, if confined solely to the bottom half, may not have significant viewing impacts.

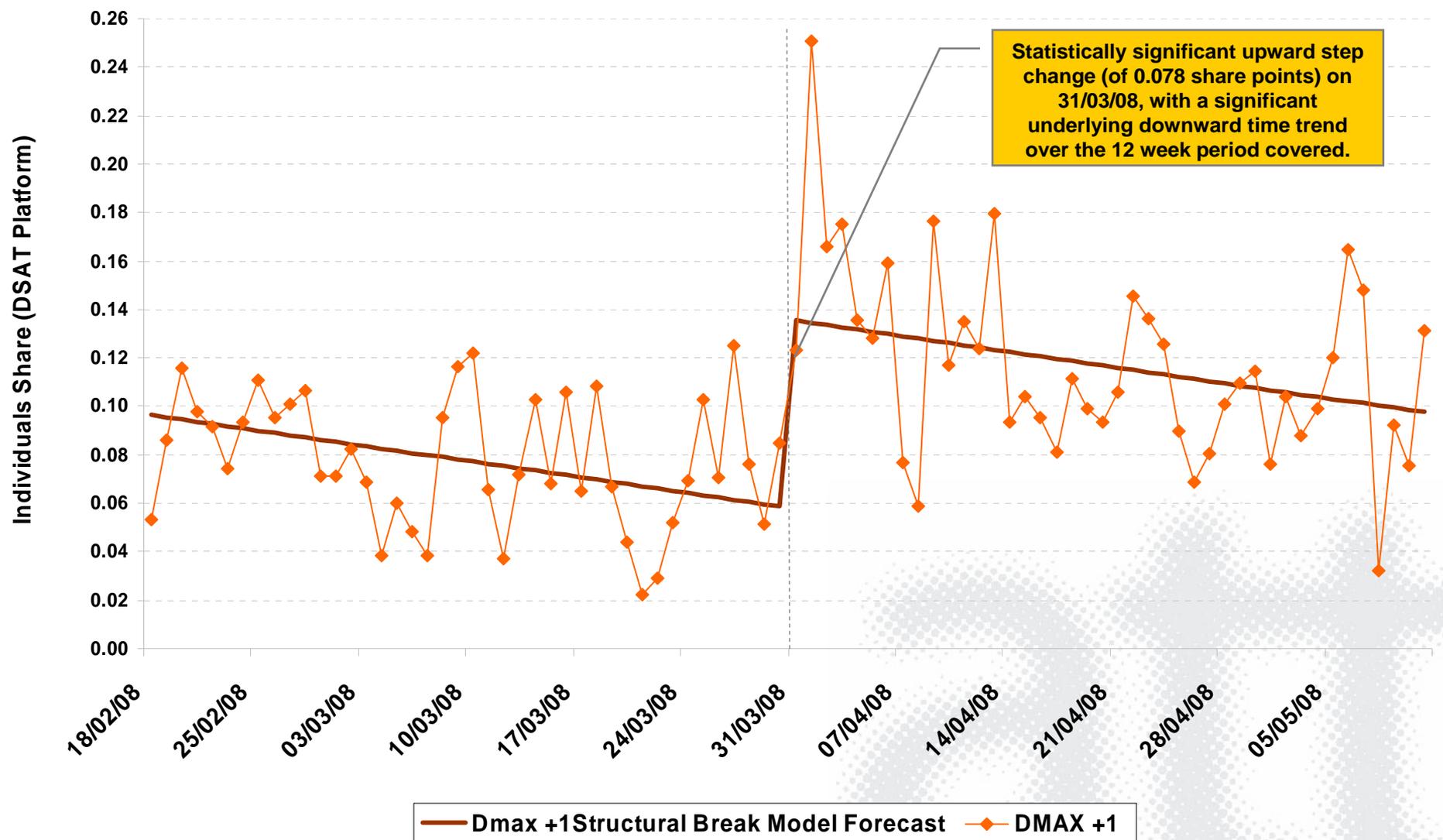
Structural Break Analysis: Discovery Entertainment Reshuffle (31/03/2008)

- Discovery's Entertainment reshuffle of 31/03/2008 is of interest as it is the first example we have of a channel making a relatively small jump in the middle of the Entertainment section, with DMax moving up one page from the top of page 6 to the top of page 5. This was accompanied by a much larger move by DMax +1 from the bottom of page 9 to just below DMax on page 5.

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
DMax	6 to 5; up 1	0.160	0.141	-0.019	-12%	1.75	0.08	No	Yes (downward)	No	No
DMax+1	9 to 5; up 4	0.078	0.116	0.039	50%	-5.27	0.00	Yes	Yes (downward)	Yes	Yes

- Rather paradoxically, DMax's share of viewing actually dropped, despite it's move up the EPG, although this could not be associated with a statistically significant step change at the time of the reshuffle. Indeed, a statistically significant downward trend over the period as a whole suggests that there was already downward pressure on DMax's audience before the reshuffle took place. Overall, however, there is simply too much variance in the data for us to establish any robust causal relationships.
- Fortunately this is not the case for DMax+1, which saw a statistically significant 50% rise in its share from 0.078 to 0.116 (up 0.039 share points). The structural break test, however, also confirms the presence of an underlying downward time trend, which is likely to have masked the full extent of the uplift, as it would have been acting in the opposite direction. It is best to illustrate this by plotting the forecast from our structural break model against DMax+1's actual daily viewing shares.

Structural Break Analysis: Discovery Entertainment Reshuffle (31/03/2008)



- As can be seen above, the structural break model puts the boost to DMax+1's audience coinciding with the EPG change at 0.078 share points, double that suggested by the t-test comparison of the pre- and post reshuffle six-week averages.
- Given that, in the preceding Viacom examples, two similar, if somewhat smaller, moves exhibited only marginally positive impacts, the very significant boost to DMax+1's audience, following its move to the slot just below DMax, is further evidence of the benefits for a time-shifted channel associated with a consecutive primary/time-shifted channel pairing.



Structural Break Analysis: Discovery Documentaries Reshuffle (07/04/2008)

- Discovery's Documentaries reshuffle of 07/04/2008, involved Animal Planet moving down one slot to make room for Discovery Science, which moved up 11 places from the middle of page 2 to the middle of page 1, while Animal Planet +1, whose slot was now taken by Animal Planet, moved down into Discovery Science's old slot on page 2.

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
Discovery Animal Planet	No change at 1	0.171	0.175	0.003	2%	-0.28	0.78	No	No	No	No
Discovery Animal Planet +1	1 to 2; down 1	0.144	0.075	-0.069	-48%	8.58	0.00	Yes	No	Yes	Yes
Discovery Science	2 to 1; up 1	0.152	0.205	0.053	35%	-3.53	0.00	Yes	No	Yes	Yes

- There was no significant impact on Animal Planet's audience, but moving onto the first page resulted in a significant 35% boost to Discovery Science's share, which rose by 0.053 share points. The loss of its position on the first page, however, resulted in a 48% drop in the audience share of Animal Planet +1, which fell by 0.69 share points.
- The fact that Animal Planet +1's loss significantly exceeded Discovery Science's gain (in both absolute and percentage terms), is further evidence that time-shifted channels generally gain an additional viewing boost by being next to their primary counterparts.

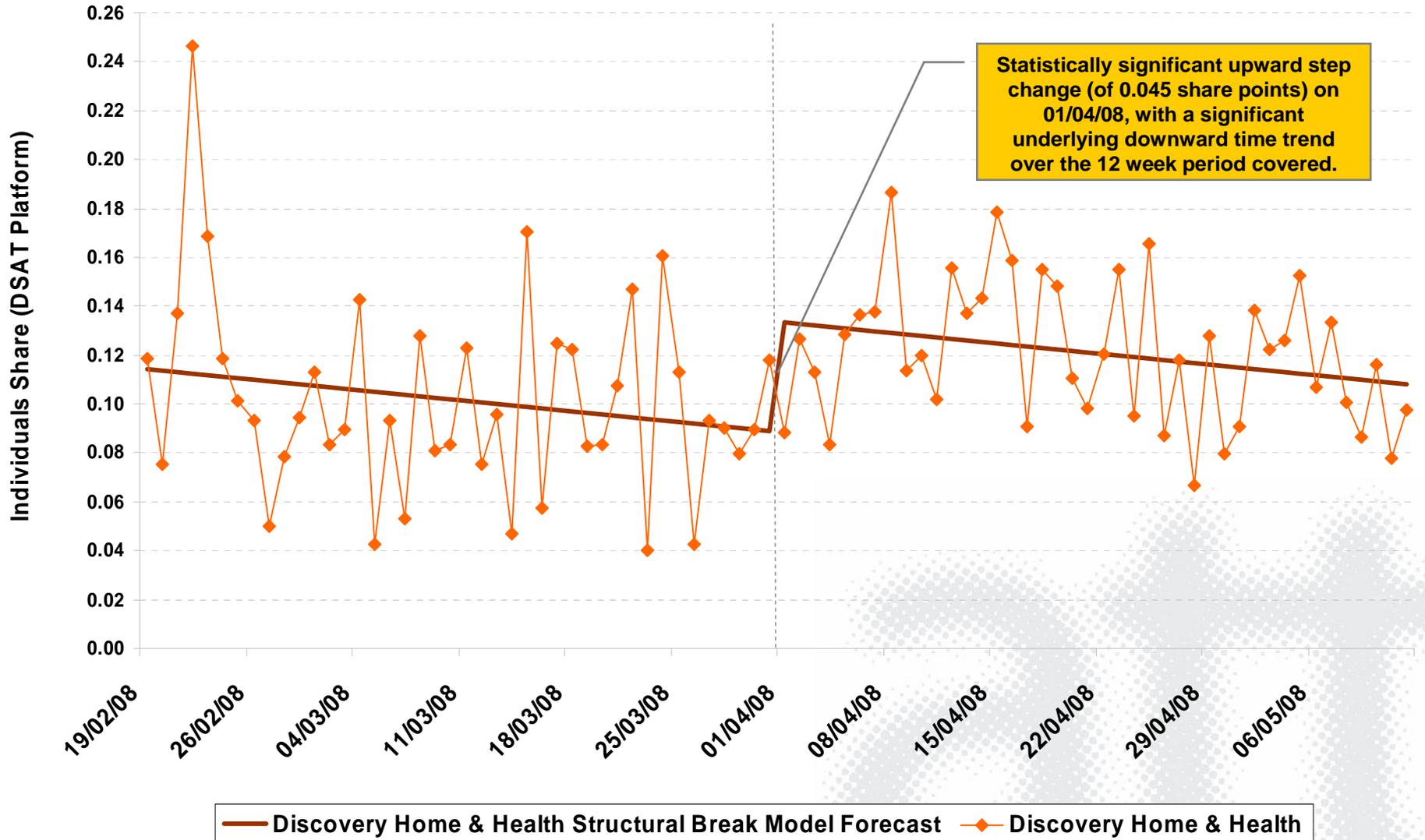
Structural Break Analysis: Discovery Lifestyle & Culture Reshuffle (01/04/2008)

- Discovery's Lifestyle & Culture reshuffle of 01/04/2008 involved a reorganisation of the Discovery slots at the top of the first page of the Lifestyle & Culture section that saw Real Time +1 moving away from its primary counterparts, at the top of the first page into Home & Health's slot in the middle of page 2, with Home & Health moving up to the third slot on the first page.

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
Discovery Real Time	No change at 1	0.230	0.231	0.000	0%	-0.03	0.98	No	No	No	No
Discovery Real Time +1	1 to 2; down 1	0.151	0.068	-0.083	-55%	8.85	0.00	Yes	No	Yes	Yes
Discovery Home & Health	2 to 1; up 1	0.101	0.121	0.020	19%	-2.54	0.01	Yes	Yes (downward)	Yes	Yes

- Real Time proved impervious to the changes going on beneath it, but Real Time +1's move from its prime location coincided with a 55% drop in its performance, a fall of 0.083 share points. Though masked by an underlying downward time trend at the time of the EPG change (see structural break model forecast below), the actual 0.045 point boost to Home & Health's share that coincided with its move to the first page was still significantly lower than Real Time +1's losses.

Structural Break Analysis: Discovery Lifestyle & Culture Reshuffle (01/04/2008)



Structural Break Analysis: Discovery Lifestyle & Culture Reshuffle (21/07/2008)

- Discovery's Lifestyle & Culture reshuffle of 21/07/2008 reversed the changes made in the earlier (01/04/2008) one, with Home & Health and Real Time +1 being moved back into their original slots.

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
Discovery Real Time	No change at 1	0.168	0.172	0.0039	2.3%	-0.34	0.73	No	No	No	No
Discovery Real Time +1	2 to 1; up 1	0.066	0.107	0.041	63%	-4.58	0.00	Yes	No	Yes	Yes
Discovery Home & Health	1 to 2; down 1	0.131	0.091	-0.041	-31%	4.13	0.00	Yes	No	Yes	Yes

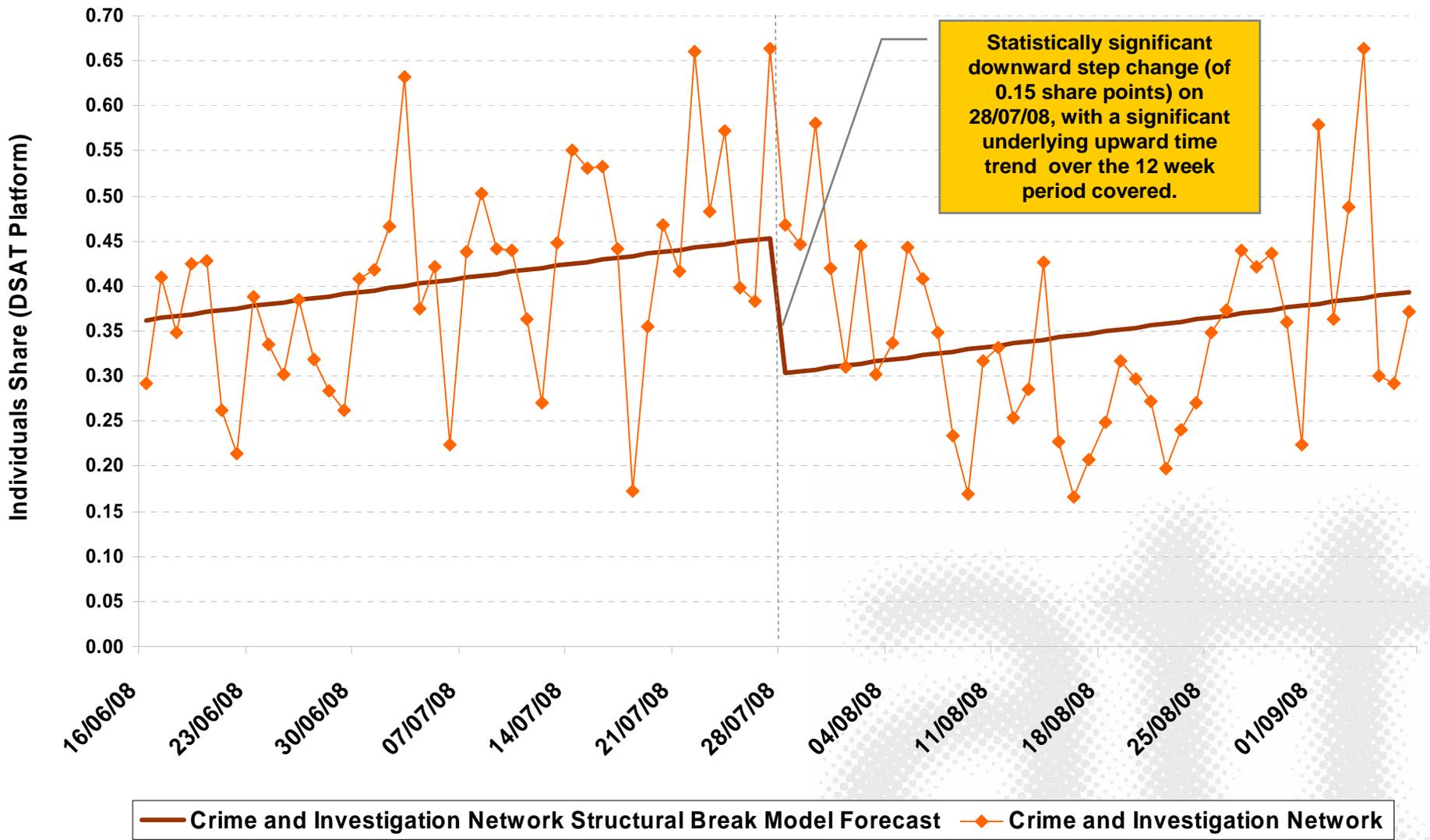
- The resulting loss to Home & Health is very similar to the underlying gain from the earlier move (0.041 vs. 0.045), although 3 months on there is no longer any evidence of the underlying downward time trend.
- The gain to Real Time +1 , however, is significantly lower than the loss from the previous move (0.041 vs. 0.083), although this can be explained by a combination of the underlying variances in the data and the fact that the Real Time audience in July was down overall from its level in April.

- The final example in our analysis of actual EPG changes is the A&E Documentaries reshuffle of 28/07/2008. This involved moving the Crime & Investigation Network from its relatively prominent position near the top of the second page to the middle of the third page, making it the final channel in the Documentaries section of the Sky EPG. This rather radical move allowed the new Military History channel to launch in Crime & Investigation's old slot.

Channel Name	Position Change (Genre Based EPG Pages)	Individuals Share (DSAT Platform): Daily Average				Independent Sample T-Test			Structural Break Test		Statistically Significant EPG Change Impact Detected?
		6 weeks before EPG Change	6 weeks after EPG Change	Absolute Change	% Change	t- value	p-value; significant if 0.05 or less	Statistically Significant Difference?	Statistically Significant Time-Trend?	Statistically Significant Step Change?	
Crime & Investigation Network	2 to 3; down 1	0.408	0.348	-0.060	-15%	2.40	0.02	Yes	Yes (upward)	Yes	Yes

- This resulted in a statistically significant drop of 0.060 points in Crime & Investigation's 6-week share average after the reshuffle. But, as can be seen from the structural break model forecast below, the presence of a significant upward time trend actually masked the full extent of the downturn, with the true impact being a 0.15 share point downward step change at the time of the reshuffle.

Structural Break Analysis: A&E Documentaries Reshuffle (28/07/2008)



- There can be little doubt that Sky EPG positioning has a significant impact on channel performance.
- In all the examples we analysed that involved major moves into or out of prominent positions within the Entertainment, Documentaries and Lifestyle & Culture sections of the Sky EPG, we were able to establish statistically significant impacts on channel performance.
- The transfer of the Lifestyle channels from relatively prominent positions in the upper half of the Entertainment section to the newly created Lifestyle & Culture section, on 28/02/2006, also had a very significant negative impact on their performance.
- The Lifestyle & Culture section has consistently proved to be the least popular of the major genre choice options, severely curtailing the ability of the Lifestyle channels to attract browsing viewers.
- There is also evidence to suggest that the probability of attracting browsing viewers drops off very significantly in the lower half of the Entertainment section, with the paradoxical result that, even a substantial move, if confined solely to the bottom half of the list, may not have significant viewing impacts.
- Finally, there is also compelling evidence to suggest that, provided they are next to each other on the EPG, primary channels tend to boost the viewing of their time-shifted counterparts by acting as advertisers for their content.