NIELSEN IBOPE MÉXICO

GUÍA DE USO DE DATOS

TELEVISION AUDIENCE MEASUREMENT

INTRODUCCIÓN

Gran cantidad de usuarios de la información de audiencias de televisión de Nielsen IBOPE se ha encontrado alguna vez ante la necesidad de conocer los lineamientos para el uso de datos, principalmente la de conocer el número mínimo de casos de un target en muestra para realizar consultas de ratings con "validez estadística".

Sobre el tema existen prácticas y recomendaciones que distintos actores de la industria de medios suelen seguir para la realización de análisis, planeación o estrategias de negociación. Lo cierto es que éstas no siempre se fundamentan en información estadística.

Dado lo anterior, la presente guía tiene por objetivo ayudar a los usuarios a entender de forma sencilla y amigable cómo consultar estimadores más confiables, es decir, con menor error estándar. Para ello el documento contiene recomendaciones generales sobre el número de casos en muestra para el uso de targets y enfatiza la necesidad del uso de la macro[1] generada por NIM para calcular el error estándar y así identificar qué tan confiable es un estimador.

Estas recomendaciones resultan de gran importancia en el uso cotidiano de la información por lo que exhortamos a la industria de medios a mantenerlas vigentes y aplicarlas, ya que resultan buenas prácticas a seguir por los tomadores de decisiones.

[1] La Macro Error Estándar NIM 2020 se podrá encontrar en el portal de descargas de bases de datos NIM en la siguiente ruta: Audiencias TV 5 Dominios Universos 2020 / Macro Error Estándar NIM 2020 y Audiencias TV 3 Dominios Universos 2020 / Macro Error Estándar NIM 2020.

GLOSARIO BÁSICO[2]

Error estándar del estimador de rating: Es la diferencia del rating de la muestra respecto al de una población completa.

Intervalo de confianza: Un intervalo de confianza es un rango de valores derivado de los estadísticos de la muestra (error estándar), que se estima incluye el valor del parámetro de población desconocido. Debido a su naturaleza aleatoria, es poco probable que dos muestras de una población en particular produzcan intervalos de confianza idénticos. Sin embargo, si usted repitiera muchas veces su muestra, un determinado porcentaje de los intervalos de confianza resultantes incluiría el parámetro de población desconocido.

Nivel de confianza: Indica en qué medida el éxito de la medición de un fenómeno no depende del azar, usualmente los intervalos se construyen al 95% de confianza. Esto es, si se tomaran muestras de la población una y otra vez, el valor a estimar estará contenido en el intervalo el 95% de las veces.

Error relativo: es el resultado de dividir el error estándar de un rating entre el valor total del rating. Se utiliza regularmente para dimensionar el error como porcentaje del rating estimado.

[2] Todos estos conceptos estadísticos son aplicables a otras variables de audiencia

NÚMERO DE CASOS MÍNIMO PARA REALIZAR UN TARGET

El tamaño de muestra mínimo para analizar un target debe estar determinado por la precisión requerida y por lo tanto por el error estándar de la estimación. Para que el usuario minimice o contenga el incremento del error estándar, las dos variables más importantes que se deben tener en cuenta son los casos que hay de un target en la muestra y el tamaño del estimador consultado (Rating, Alcance, Ats, etc.).

¿Cuál es el número mínimo de casos conforme a lineamientos internacionales?

Existen lineamientos internacionales con recomendaciones generales que sugieren el número mínimo de casos en la muestra para estimar indicadores de audiencia (Anexo 1); sin embargo Nielsen IBOPE México recomienda usar el cálculo de los errores estándar alineado al diseño del servicio TAM mediante el uso de la macro diseñada por NIM para este fin.

Según los estándares del Media Rating Council (MRC) en Estados Unidos, el número mínimo de casos en muestra recomendado para permitir el análisis de un target es de 30 casos. El Global Guidelines for Television Audience Measurement (GGTAM) tiene lineamientos más conservadores que aplican principalmente en Europa.

Nielsen en Estados Unidos se rige por el número mínimo de casos de GGTAM, y en México reiteramos el uso de cálculo de los errores estándar para conocer la precisión de las estimaciones y así poder hacer buen uso de las variables de audiencia. Como se aprecia en el Anexo 2 el número mínimo de casos recomendado depende de la precisión y del tamaño del rating.

Para evitar casos extremos de uso riesgoso de la información, el software de consulta de Nielsen IBOPE establece 30 casos en muestra como un nivel mínimo para el cálculo de estimadores[3].

¿Qué se recomienda hacer cuando hay un número pequeño de casos de un target en la muestra?

Resulta una práctica común en la industria realizar análisis de audiencias a partir de la definición de targets de consulta perfilados (hábitos de consumo, estilos de vida, etc.), bajo el entendido de que una mayor definición del target conlleva a mayor precisión acerca del grupo objetivo al que se desea llegar, situación sólo cierta si se cuenta con un tamaño de muestra suficiente.

Por tanto se debe considerar que al crear un target de consumo de televisión es poco recomendable utilizar demasiadas variables demográficas, ya que entre más demográficos se seleccionen, menor será el número de casos muestrales, lo cual genera variabilidad en los datos.

Con la finalidad de hacer uso correcto de la información se recomienda:

[3] En el módulo de creación de targets en los software Media Quiz y Media Smart Station es posible observar por colores (rojo, amarillo y verde) la identificación del número de casos con el que se trabaja un target en un análisis específico: rojo = 30 casos o menos (no utilizar), amarillo = 31 a 49 casos (utilizar con muchas reservas) y verde más de 50 casos (análisis con mayor estabilidad). Para mayor ilustración ver Anexo 3.

- Integrar casos que no son parte del target, pero que tienen características demográficas similares, ya que puede contribuir a dar estabilidad en los resultados sin impactar demasiado al público objetivo. De lo contrario, se tendrán que considerar intervalos de confianza más amplios.

- Si el evento a analizar es transmitido en más de un canal, se recomienda incluir estos canales en una macrocadena.

- Si el contenido televisivo a evaluar se transmite en más de una ocasión, se sugiere acumular en una sola consulta las distintas transmisiones.

- Acumular bandas horarias.

Una buena práctica recomendada por Nielsen IBOPE México es la de hacer consultas de periodos de tiempo en lugar de consultas minuto a minuto, esto para reducir o acotar el error estándar en las estimaciones de audiencia. El error estándar de un rating promedio de varios minutos (por ejemplo, el de un programa) será menor que el error estándar de un rating del mismo tamaño que provenga de un minuto en específico ya que el número de observaciones aumenta.

A continuación se presenta un ejemplo de la disminución del error estándar al generar acumulaciones de tiempo:

➔ 20% de 1 minuto de un programa vs promedio de 1 minuto en 3 días del mismo programa.
➔ 33% de 1 minuto de un programa vs promedio de 1 minuto en 5 días del mismo programa.

DOMINIOS INDICATIVOS DE GUADALAJARA Y MONTERREY

Como parte de la evolución del servicio de medición de audiencias de televisión TAM Evolution, Guadalajara y Monterrey se convierten en dominios indicativos ya que el tamaño de muestra se reduce en función a su peso poblacional dentro de las 28 ciudades. Por esta razón, para tener estimadores de audiencia más confiables, Nielsen IBOPE México recomienda acumulación de días de observación dependiendo el canal, y un número mínimo de casos en el target consultado. Para cualquier otra consulta no especificada en las tablas, se reitera el uso de la macro de errores estándar.

MONTERREY Y CANALES NACIONALES

CANAL	HOGARES	INDIVIDUOS	TARGET	MIN. DE CASOS

LAS ESTRELLAS	7 días	7 días	14 días	186 casos
CANAL 5	7 días	7 días	14 días	186 casos
NU9VE	14 días	14 días	Por lo menos 14 días	186 casos
AZTECA 7	14 días	14 días	Por lo menos 14 días	186 casos
AZTECA UNO	14 días	14 días	Por lo menos 14 días	186 casos
IMAGEN TV	7 días	14 días	Por lo menos 28 días	210 casos
ACUMULAR DÍAS				

MONTERREY Y CANALES LOCALES

CANAL	HOGARES	INDIVIDUOS	TARGET	MIN. DE CASOS
CANAL 8 (TVSA MTY.)	14 días	14 días	Por lo menos 14 días	186 casos
MULTIMEDIOS	7 días	7 días	14 días	186 casos
CANAL 4 (TVSA MTY.)	7 días	7 días	14 días	186 casos
MULTIMEDIOS 2	14 días	21 días	28 días	188 casos
ACUMULAR DÍAS				

GUADALAJARA Y CANALES NACIONALES

CANAL	HOGARES	INDIVIDUOS	TARGET	MIN. DE CASOS

LAS ESTRELLAS	7 días	7 días	14 días	186 casos
CANAL 5	7 días	7 días	14 días	186 casos
NU9VE	Por lo menos 28 días	Por lo menos 28 días	No recomendado	186 casos
AZTECA 7	14 días	14 días	Por lo menos 14 días	186 casos
AZTECA UNO	14 días	14 días	Por lo menos 14 días	186 casos
IMAGEN TV	7 días	14 días	Por lo menos 28 días	210 casos
ACUMULAR DÍAS				

GUADALAJARA Y CANALES LOCALES

CANAL	HOGARES	INDIVIDUOS	TARGET	MIN. DE CASOS
MÁS VISIÓN (+V)	Por lo menos 21 días	Por lo menos 21 días	No recomendado	650 casos
CANAL 4 GDL.	7 días	7 días	14 días	209 casos
ACUMULAR DÍAS				

ALCANCE Y FRECUENCIA

Impactos esperados en momentos de alta rotación de panelistas (por ejemplo en el periodo de rotación acelerada y en el de transición a proporcionalidad)

Los movimientos masivos de entradas y salidas de hogares en la muestra, pueden tener un impacto en la estimación de variables altamente dependientes de la continuidad del panel como en el caso del Alcance y Frecuencia, principalmente cuando se realizan consultas de periodos largos. Entre mayor sea el movimiento en la rotación, mayor será el impacto en la estimación del Alcance, tal y como ocurrió en el periodo de rotación acelerada y en menor medida durante el proceso de proporcionalidad del panel.

Es importante que el usuario considere los siguientes promedios de baja de Alcance y alza de Frecuencia como ejemplos del efecto de los movimientos observados en la rotación acelerada del 2012-2013 y no como una tasa de ajuste que pueda ser usada de forma generalizada, ya que en los distintos targets analizados se registraron diferencias con mayor o menor dimensión[4].

La diferencia de Alcance estará presente a medida que las campañas se sostengan durante un largo periodo de tiempo, como ejemplo los siguientes datos (Ver anexo 4):

- -1.5% de Alcance promedio en campañas mensuales.
- -6.4% de Alcance promedio en campañas trimestrales.
- -14.7% de Alcance promedio en campañas semestrales.

El incremento de Frecuencia suele ser mayor a medida que las campañas se sostienen por más tiempo, como ejemplo los siguientes datos:

- +1.6% de Frecuencia promedio en campañas mensuales.
- +6.8% de Frecuencia promedio en campañas trimestrales.
- +17.3% de Frecuencia promedio en campañas semestrales.

Por consiguiente se recomienda:

- Tener en consideración que las bajas de Alcance o alzas de Frecuencia no tienen relación con el mix de canales y horarios seleccionados; la causa de este fenómeno es el cambio de los hogares y personas del panel.
- Analizar las campañas en periodos menores o iguales a tres meses, ya que en consultas superiores los impactos en Alcance y Frecuencia serán mayores.
- Utilizar targets de análisis más robustos, ya que en targets perfilados las diferencias en Alcance y Frecuencia pueden superar los promedios mencionados.

¿Qué se recomienda para disminuir la variación en la post-evaluación y la planeación?

Las siguientes recomendaciones, tanto para la planeación como para la post-evaluación, son producto de todas aquellas señaladas en esta guía y otras que surgen a partir de sugerencias hechas en otros mercados como el inglés, con base en un análisis presentado en el congreso internacional de ESOMAR, Broadcast Audience Research, en Viena, Austria, en abril de 1998 (Anexo 6).

Tanto para la planeación como para la post-evaluación, la mínima expresión de análisis es el soporte, el cual está determinado por un periodo de tiempo (1 minuto, 15 minutos…).

Por tal motivo, hay que cuidar los siguientes aspectos:

[4] Total personas con Guest Viewers, personas 19+ con guest viewers, personas 19+ sin DE con guest viewers, personas 4-12 con guest viewers, amas de casa, mujeres ABC+C 19-44 con guest viewers, mujeres C C- D+ 19-44 con guest viewers, hombres ABC+C 19-44 con guest viewers, hombres C C-D+ 19-44 con guest viewers, personas ABC+C 19-44 con guest viewers, personas C C- D+ 19-44 con guest viewers, amas de casa ABC+C, amas de casa C C- D+, personas 4-12 ABC+C con guest viewers, personas 4-12 C C- D+ con guest viewers, personas 13-18 ABC+C con guest viewers, personas 13-18 C C- D+ con guest viewers, total hogares.

- Cualquier intento para minimizar el error estándar en evaluaciones de spot individual a partir de targets muy perfilados resulta infructuoso.
- La post-evaluación debe ser en agregados como “weekly” o preferiblemente “Total GRP”, no por “spot individual”.
- Al utilizar acumulados para la planeación o post-evaluación debe considerarse que a medida que se requiera controlar resultados por canal, horarios, etc. deberán contemplarse periodos de mayor acumulación al “weekly”.
- En caso extraordinario de requerirse evaluaciones puntuales por spot es mejor aplicar resultados de audiencia media por períodos de 30 o más minutos.
- Se sugiere hacer uso de la variable GRP ya que ésta no sufre impactos significativos asociados a la rotación.
- La evaluación por acumulados, por ejemplo de GRP, disminuye en forma significativa el error estándar, principalmente en pautas con pequeños tamaños de ratings por spot y canal.
- Analizar las campañas en periodos menores o iguales a tres meses.

VARIABLE ERROR ESTÁNDAR RELATIVO EN LA MSS

A partir de la versión 2.3 de la Media Smart Station (MSS), para cada consulta realizada en los módulos de *reports* las variables de rating y share, el sistema puede devolver (si es requerido por el usuario) la variable del Error Estándar Relativo (ver glosario básico).

Es importante indicar que el Error Estándar Relativo en la MSS se trata de una aproximación rápida al error estándar real, ya que es el cálculo teórico bajo el supuesto de una muestra aleatoria simple con un intervalo de confianza al 95%. Para tener una estimación más precisa del margen de error, es necesario el uso de la macro del cálculo de errores estándares. Para cualquier pregunta sobre la interpretación y uso de esta variable así como del manejo de la macro, recomendamos contactar a nuestro departamento de Client Service.

Tomando como base las definiciones estipuladas en el capítulo “Glosario básico” de la presente guía, el Error Estándar Relativo se entiende como la diferencia del rating de la muestra respecto al de una población completa, dividido entre el valor del propio rating.

Uso e interpretación de la variable Error Estándar Relativo

Para simplificar su uso, el Error Estándar Relativo incluido en la MSS tiene aplicado de manera predefinida el 95% de Confianza.

Dado lo anterior, para calcular el Intervalo de Confianza al 95% de la consulta realizada, con sus límites máximo y mínimo, basta con multiplicar el rating % con su error relativo sumando con el rating% para obtener el límite superior y restando al rating para obtener el límite inferior de la estimación.

CONSIDERACIONES PARA EL ANÁLISIS DE LA AUDIENCIA POR SERIES DE TIEMPO

Existen factores intrínsecos y extrínsecos a la medición de audiencias de televisión que influyen en el comportamiento de las audiencias, generando cambios en las "tendencias" de las mismas.

Dentro de los factores intrínsecos más importantes que se deben considerar al momento de realizar comparativos de audiencias entre distintos periodos de tiempo tenemos las actualizaciones de universos y los cambios en la metodología de la investigación.

Actualización de Universos:

Uno de los elementos fundamentales de la Medición de Audiencias de Televisión de Nielsen IBOPE México es que el panel de hogares -a través del cual se obtienen las audiencias- sea representativo del universo del cual es seleccionado. Por representativo nos referimos entre otras cosas, a que el panel de hogares refleje la estructura demográfica del universo de estudio, para lo cual cada determinado tiempo se realiza la actualización de universos y por ende una actualización paulatina del panel para reflejar la nueva estructura establecida; estas actualizaciones pueden generar ciertos cambios en las tendencias de audiencias.

Cambios en la metodología de investigación:

Con el objetivo de mejorar la calidad de la medición de audiencias de televisión, Nielsen IBOPE México puede realizar cambios en la metodología de investigación. Cuando se aplican este tipo de cambios metodológicos, las audiencias reflejan de manera más precisa los hábitos de los telespectadores.

Dado lo anterior, Nielsen IBOPE México emite diversos comunicados en los cuales da a conocer a los usuarios de la información la aplicación de cambios y elementos intrínsecos que pueden llegar a tener impactos en las audiencias, por lo cual se recomienda tener presentes estos elementos al realizar comparativos de información entre periodos de tiempo.

Son diversos los factores del entorno que tienen implicaciones en los cambios de hábitos del consumo de medios. Por ejemplo, la transición a la Televisión Digital Terrestre en México ocurrida en 2015 causó un cambio importante y sin igual en las audiencias, ocasionado entre otros por:

- Hogares que pierden parte o toda posibilidad de ver TV como lo hacían antes del "apagón analógico".
- Cambio en la dinámica de adquisición de nuevos sistemas o equipos para no dejar de ver la TV.
- Mayor uso de otros dispositivos conectados al televisor que los hogares previamente ya tenían como videojuegos, DVD, Blu-Ray, etcétera.
- Recepción de nueva oferta programática debido a la aparición de nuevos canales TDT (los cuales los hogares no tenían la oportunidad de sintonizar antes) o por la nueva oferta de canales después de haber contratado un sistema de TV Paga o servicios de contenido vía internet.

Estos elementos impactan de forma importante tanto los hábitos de consumo de TV como la propia estructura del universo de estudio (hogares que tienen al menos un televisor funcionado y recibe alguna señal/canal de televisión, posibilitando a sus integrantes tener acceso a dicha señal/canal), por lo cual se recomienda NO realizar comparativos lineales entre las mediciones Pre y Post transición digital.

ANEXO 1

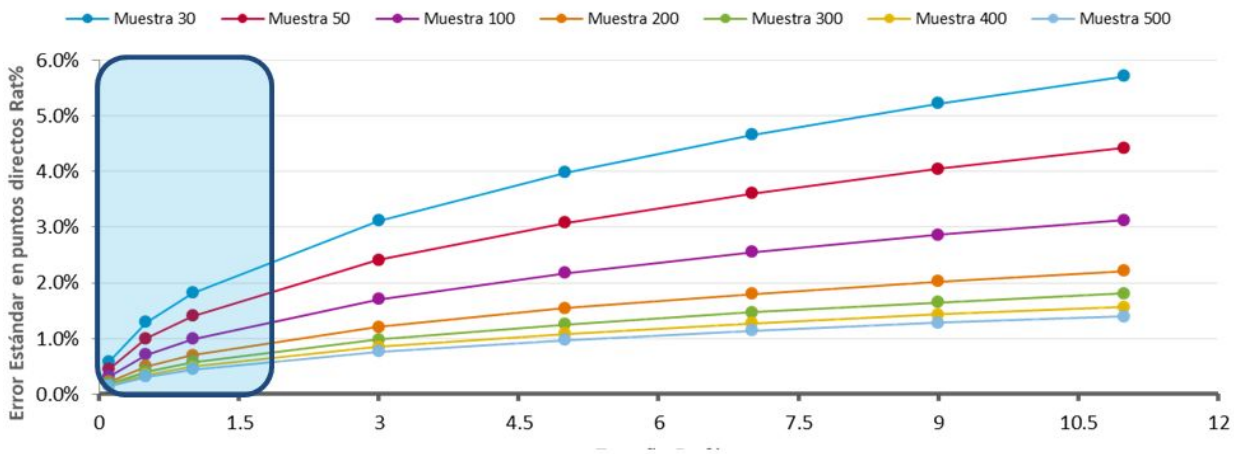
Lineamientos Internacionales

FUENTE	MUESTRA MÍNIMA PARA CREAR O ANALIZAR UN TARGET	MUESTRA MÍNIMA PARA FINES COMERCIALES
IBOPE AGB	30	50
NIELSEN US	50	
MRC (US STANDARD)	30	
GGTAM	50	75

Entiéndase como muestra mínima óptima el número de casos necesario para considerar robusta una muestra.

Anexo 2

En el siguiente gráfico se expone un ejercicio teórico para verificar el mínimo número de casos en muestra que podría ser establecido como óptimo en torno a los distintos tamaños de ratings que regularmente maneja la industria.



Cada línea representa un número de casos en muestra y presenta el comportamiento del error estándar de acuerdo con los diferentes tamaños de rating que van desde 0.1% a 11%. Sobre el

análisis:

El recuadro azul enmarca la zona en donde se encuentra 80% de los distintos tamaños de rating de 17 targets (en individuos).[5]

Este ejercicio explica que respecto a los tamaños de rating con los que actualmente trabaja la industria (recuadro azul), targets de entre 200 y 500 casos podrían considerar un error estándar muy cercano, lo cual contribuiría a dar mayor certidumbre acerca de análisis "puntuales"; es decir, consulta diaria y franjas en minutos. Cuando se trabaja con menos de 200 casos, y en especial con menos de 100, los errores estándar serán significativamente más grandes dado que los tamaños de muestra no tienen un efecto lineal en ellos.

Anexo 3

Creación de targets en MSS

La creación de targets en el software MSS está ligada a un archivo denominado "semáforos" que determina el número de casos necesario para crearlos. Las definiciones son las siguientes:

- **Verde:** target cumple con el número mínimo recomendado de casos (>=50casos).
- **Amarillo:** indica que el target cumple con el número de casos suficientes para consultas exploratorias (30 a 49 casos).
- **Rojo:** indica que el target NO cumple con el número de casos para ser creado o evaluado (<30 casos).

Click to toggle report info details ...

	General Definitions								
	Date	Id	Name	Abbreviation	Definition	Type	%	Cases	Thousands
Universe									
1	N/A	0	Universe	Univ		individual	100.000000	7157	50,623.018...
Demographic Targets - System									
Demographic Targets - Local									
2	N/A	24086	Total Hogares	Total Hogares	HHL: (Hoga...	households	100.000000	1881	14,346.370...
3	N/A	24102	Ind No TV Pagada (con ...	Ind No TV P...	TVP: (No).	individual	59.480631	4673	30,110.890...
4	N/A	24103	Ind No TV Pagada (sin g...	Ind No TV P...	TVP: (No).	individual	59.480631	4298	30,110.890...
5	N/A	24104	Ind TVPag (sin guest)	Ind TVPag (...	TVP: (Yes).	individual	40.519369	2859	20,512.127...
6	N/A	24105	Ind TVPag (con guest)	Ind TVPag (...	TVP: (Yes).	individual	40.519369	3064	20,512.127...
7	N/A	24114	Prsonas 30-44 guest	Prsonas 30...	AGE: (30 a ...	individual	24.915358	1627	12,612.906...
8	N/A	24115	Prsonas 30-44	Prsonas 30...	AGE: (30 a ...	individual	24.915358	1512	12,612.906...
9	N/A	39955	Hombres DE Guest	Hombres D...	SEX: (Homb...	individual	13.984342	1098	7,079.2958...
10	N/A	39964	Mujeres abc+ guest	Mujeres ab...	SEX: (Mujer...	individual	10.964139	838	5,550.3782...
11	N/A	66313	PP 19+ GUEST	PP 19+ GUE...	AGE: (19 a ...	individual	70.475498	5232	35,676.824...
12	N/A	66314	PP 19-29 GUEST	PP 19-29 G...	AGE: (19 a ...	individual	20.312625	1497	10,282.863...
13	N/A	66315	PP 45+ GUEST	PP 45+ GUE...	AGE: (45+ ...	individual	25.247516	2108	12,781.054...
14	N/A	66316	60 años guest	60 años gu...	EDA: (60 A...	individual	0.512276	46	259.329404
15	N/A	66317	PP 65 años guest	PP 65 años ...	EDA: (65 A...	individual	0.474069	34	239.988211
16	N/A	66318	PP 74 años guest	PP 74 años ...	EDA: (74 A...	individual	N/A	N/A	N/A
17	N/A	66319	PP 77 años guest	PP 77 años ...	EDA: (77 A...	individual	N/A	N/A	N/A

En el análisis, los targets en amarillo solamente muestran datos, mientras los marcados en rojo no:

[5] Tamaño de rating por minuto de enero 1 a septiembre 20 de 2012, en los targets personas total con guest viewers, personas 19+ con guest viewers, personas 19+ sin DE con guest viewers, personas 4-12 con guest viewers, amas de casa, mujeres ABC+C 19-44 con guest viewers, mujeres C C- D+ 19-44 con guest viewers, hombres ABC+C 19-44 con guest viewers, hombres C C- D+ 19-44 con guest viewers, personas ABC+C 19-44 con guest viewers, personas C C- D+ 19-44 con guest viewers, amas de casa ABC+C, amas de casa C C- D+, personas 4-12.

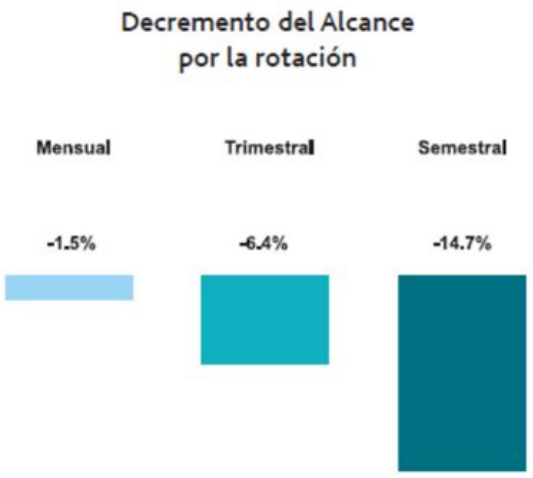
	Date	Channel	Description	PP 77 años g... rat% (Av(Wg))	PP 74 años g... rat% (Av(Wg))	PP 65 años g... rat% (Av(Wg))	60 años guest rat% (Av(Wg))
1	02/04/2012	2 NAC 021096-	DERENOMBRE/FIR SLIM	n.a	n.a	0.000000	0.000000
2	02/04/2012	2 NAC 021096-	DERENOMBRE/AHH BRA	n.a	n.a	0.000000	0.000000
3	02/04/2012	2 NAC 021096-	P.SOR METICHE	n.a	n.a	0.000000	0.037635
4	02/04/2012	2 NAC 021096-	PRIMER IMPACTO EXTRA	n.a	n.a	0.000000	0.037466
5	02/04/2012	2 NAC 021096-	HIMNO NACIONAL	n.a	n.a	0.000000	1.873282
6	02/04/2012	2 NAC 021096-	BUNKER	n.a	n.a	0.000000	1.873282
7	02/04/2012	2 NAC 021096-	FARMACIAS SIMILARES	n.a	n.a	0.000000	1.873282
8	02/04/2012	2 NAC 021096-	PRIMERO NOTICIAS	n.a	n.a	3.609193	2.131978
9	02/04/2012	2 NAC 021096-	HOY	n.a	n.a	5.919976	3.016799
10	02/04/2012	2 NAC 021096-	LA ROSA DE GUADALUPE	n.a	n.a	3.433553	6.107501
11	02/04/2012	2 NAC 021096-	EL CHAVO DEL OCHO	n.a	n.a	6.715846	1.910688
12	02/04/2012	2 NAC 021096-	NOT.DIANE PEREZ	n.a	n.a	1.607135	0.715829
13	02/04/2012	2 NAC 021096-	LAURA	n.a	n.a	4.972558	2.457796
14	02/04/2012	2 NAC 021096-	UN REFUGIO PARA EL AMOR	n.a	n.a	4.698228	6.564766

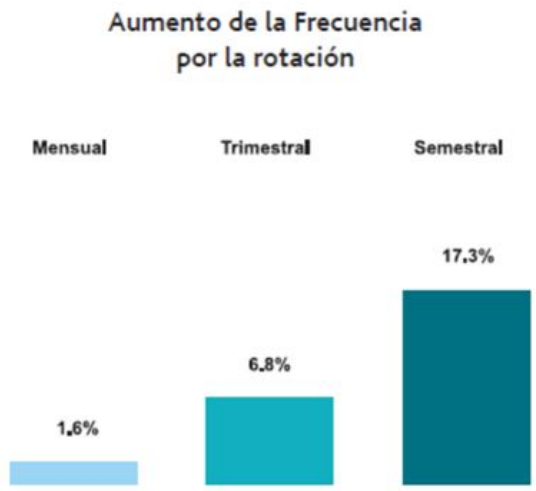
Anexo 4

Se realizó un ejercicio de simulación de rotación del panel que consideró a todos los hogares intab del 1o. de enero al 30 de junio de 2012 (6 meses de datos). En cada base diaria fue reemplazado el número de identificación de 20 hogares, por ejemplo, en la base del día 1 de enero se reemplazó el identificador de 20 hogares, el día 2 de enero se cambiaron los 20 del día 1 de enero más otros 20 nuevos, y así sucesivamente hasta cambiar el identificador de todos los hogares del panel hasta el último día de junio. Una vez ejecutados estos cambios de identificador de hogares, se calculó el Alcance y Frecuencia de varias campañas publicitarias de distintos sectores cuya duración fuera de un mes, otra de tres meses y una última de seis meses. Asimismo, se calcularon los datos en 17 targets de personas[6], los más utilizados por la industria.

Los resultados obtenidos derivaron los siguientes resultados -en promedio- de todos los targets consultados, como se muestra en los siguientes gráficos:

[6] Total personas con guest viewers, personas 19+ con guests viewers, personas 19+ sin DE con guest viewers, personas 4-12 con guests viewers, amas de casa, mujeres ABC+C 19-44 con guest viewers, mujeres C C- D+19-44 con guest viewers, hombres ABC+C 19-44 con guest viewers, hombres C C- D+ 19-44 con guest viewers, personas ABC+C 19-44 con guest viewers, personas C C- D+ 19-44 con guest viewers, amas de casa ABC+C, amas de casa C C- D+, personas 4-12 ABC+C con guest viewers, personas 4-12 C C- D+ con guest viewers, personas 13-18 ABC+C con guest viewers, personas 13-18 C C- D+ con guest viewers, total hogares.

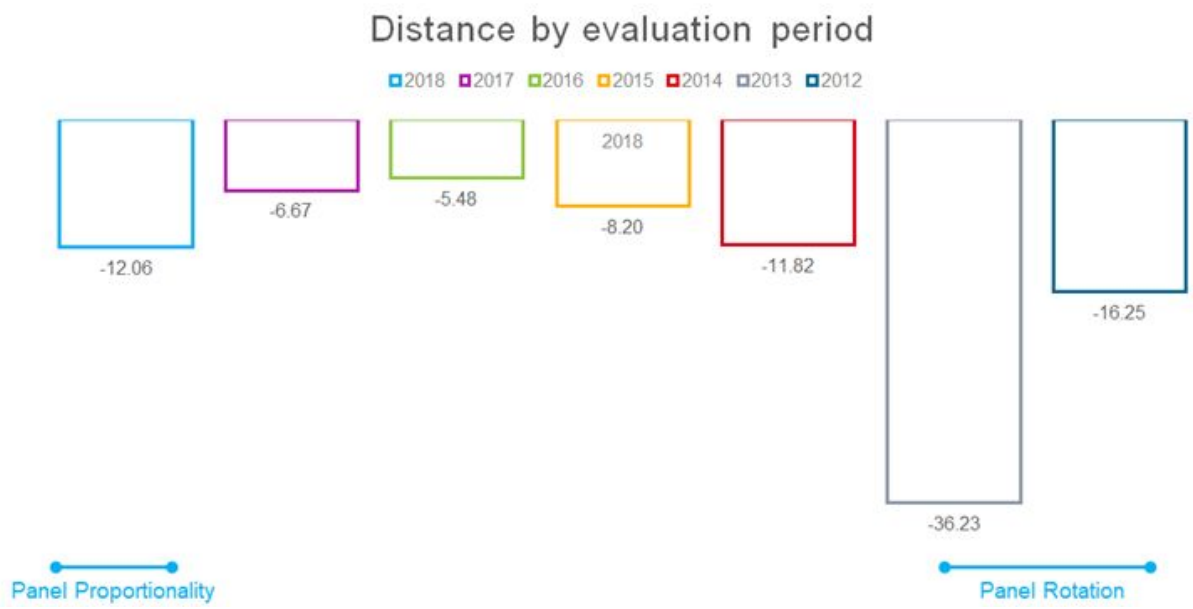




Es importante mencionar que la razón del decremento en Alcance e incremento en Frecuencia se genera por la forma en que se construyen las matrices de panel continuo dentro de su cálculo. Para cada caso en muestra se determina un expansor ponderado con base en la continuidad que cada uno tiene en el periodo de análisis seleccionado.

Anexo 5

Se analizó una pauta para los años 2012-2018 generando curvas de alcance con diferentes periodos de acumulación (Enero, enero a febrero, enero a marzo,..., enero a noviembre). Una vez construidas las curvas se identificó el periodo en el que se obtiene por primera vez el 85% de Alcance y se comparó este número de inserciones vs la acumulación de enero a noviembre del mismo año. En la gráfica siguiente se presentan las diferencias absolutas obtenidas entre la curva inicial y la correspondiente a un período de consulta de enero a noviembre. Las diferencias ilustran que la rotación del panel tiene un impacto a la baja en la estimación del Alcance cuando los períodos de evaluación son largos y que este impacto es mayor cuando hay más movimientos de entradas y salida de hogares del panel.



Spot Regular en los canales : Las estrellas, Azteca 1, Imagen TV , Azteca 7, Canal 5 y Gala TV, enero vs enero a noviembre de los diferentes años.

Anexo 6

Measuring Small Audiences:

The Challenge to Audience Measurement Systems

Tony Twyman

BARB: Broadcaster's Audience Research Board and CRCA: Commercial Radio Companies Association, United Kingdom.

Steve Wilcox

RSMB Television Research Limited, United Kingdom.

Introduction

All developments in electronic and broadcast media lead towards more stations, more choice, more targeting and the fragmentation of audiences. The creation of yet more small audience channels does not, however, eliminate the appeal of mass audience channels. These remain as mass audience advertising media, with a continuing demand for the spot by spot assessment of campaigns which has been a key feature of people meter measurement systems.

The newer and smaller media are likely to sell their advertising in a radically different way from the

mass media, with packages of spots, even packages of stations, replacing the old single spot unit of advertising measurement. They will, however, often be selling to advertisers using the mass media and wanting comparability between the meanings of assessments for their different campaigns.

The challenge to the current style of national measurements systems is how to accommodate the ever widening range of audience sizes which it is expected to measure. This is a feature of a recent paper pre- sented by Read and Johnson (1997) in which they discuss the development of the next British audience measurement specification. The core of the problem is that the smaller the audience, the larger the relative size of sampling error. This implies potential increases in sample sizes of a scale which exceeds the likely expansion of advertising revenue and research funding available. Paralleling the diverging advertising demands on research systems, the broadcasting programme makers also will have different requirements, according to the varying nature of their programming.

It is important to recognize, however, that there is not just one 'small audience problem' but a number with different potential research solutions and even in some cases no conventional solution.

The Measurement of Sampling Error

Key to any discussion of the measurement of small audiences is a realistic appreciation of the extent of sampling errors involved. We will be referring to and summarizing extracts from work in the United Kingdom and elsewhere.

First, however, we must make clear what we mean by sampling error. In the purest sense the term sampling error is used to mean the deviation of behaviour of a randomly selected sub-sample with no response bias, from the behaviour of the total population. Practical situations are far from this. Samples are not purely random and there is response bias but we still need to understand the variability of the data.

In using the term 'sampling error' we want to express the degree of variability which any measurement or comparison between measurements is subject to when there is no real change in the behaviour which it is intended to measure.

With panels there are a number of factors which contribute to the amount of statistical variability: When panels are initially recruited, the sample will be biased through: differential non-response biases inherent in the system, chance features of the particular sample selected which remain as a sample bias, changing over time as panel membership changes. Comparisons between measurements at different times involve many of the same individuals and according to the degree of correlation between their behaviour at those times, there is a reduction in sampling error. This correlation diminishes over time, however, as people get older, change their social life, their work life and their interests.

The need to balance known demographic imbalances involves weighting which can signifi- cantly decrease effective sample size and increase sampling error.

Types of Small Audience Situations

In this paper we seek to identify the range of small audience situations, the likely data requirements and how they might be researched. We are not starting with a 'clean slate' here. In most countries with broad- casting systems sufficiently developed to generate small station problems there will already be sophisti- cated people meter systems.

These have been designed initially to measure mass audiences but have been progressively expanded and adapted to report on smaller audiences. Research solutions have to be considered:

- within existing systems,
- by expanding and adapting existing systems,
- by creating entirely new research sources.

Viewing by Smaller Sub-Groups to Larger Stations

This is essentially a problem of sample size. Viewing by smaller sub-groups to larger stations is a situation which regularly occurs within existing systems and even for mass audience channels. There appears to be a law whereby, whatever the sample size, the number of sub-groups reported expands to include many for which the sample size is inadequate.

Within the current BARB system the sample sizes and sampling errors shown in Table 1 for the largest regional panel illustrate the point.

TABLE 1:
SAMPLE SIZES AND SAMPLING ERROR

	Sample Size		TVR	95% Confidence Interval
All Individuals	1204		9.6	± 24%
Adults	996		11.1	± 22%
Men	459		11.0	± 28%
Women	537		11.2	± 26%
Housewives	530		12.7	± 22%
Housewives with Children	154		9.8	± 49%
Women ABC1	296		8.9	± 42%
Men 16-34	164		5.9	± 70%
Women AB	129		4.8	± 88%
Men 16-24	62		7.8	± 88%
Children	208	8:30pm	2.5	± 105%

These sampling errors assume the panel to be perfectly balanced. In reality the sampling errors are up to

20% larger for the actual panel which is weighted to correct for demographic profile imbalances. So these sampling errors represent the best that could be achieved given the total number of homes available. It is salutary to note that these sampling errors are for a peak time rating on the largest

commercial TV station in the United Kingdom.

Any attempt at optimizing the choice of individual spots on the smaller sub-groups is clearly a waste of time. One common response to statistics such as these is that practices should change and that trading should

be based on larger more reliable sub-groups and/or that optimizations and appraisal should be in terms

of schedules rather than individual spots. The statistical reliability of this approach is discussed in a later section.

Another approach under test in the United Kingdom for regional sub-groups is that of modeling or fac- toring from the network panel.

The principle is that a regional panel measures the main audience categories directly. Sub-group audiences are then factored by applying the relationship between the sub-group and the main category found at that time on the larger network panel, to the directly measured regional main category audience. This factor is derived after weighting the network data to match the demographic profile of the region. A summary of this is provided in a later section.

This approach can be used to reduce sub-group variability equivalent to increasing effective sample size by between 50% and 100%. This is an increase beyond the levels of affordability, but even that is not enough where the market is trying to trade on sub-groups with samples of fifty.

This approach we believe could be used in the United Kingdom and help to make sub-group data more reliable. It is, however, viable only in conditions such as in the United Kingdom where there is a broad fra- mework of consistency in programming across the regions within the network and few marked deviations of programming style at the regional level. We have not found evidence that regional variations in pro- gramming do affect the validity of factoring.

Factoring, however, applies most readily to a regional panel structure for mass audiences. It is no solution for small area channels like cable or niche channels. Overall our solution to small sub-group audiences on larger panels is to suggest that the sampling errors should be examined (as above), samples increased to what is affordable and to accept that trading on spots for those sub-groups which cannot be measured reliably will be unproductive.

Steps which can help are trading and appraisal in terms of schedules of spots and in appropriate cases, factoring.

Viewing by Large Sub-Groups to Smaller Stations or Large Stations at Off-Peak Times. Put more simply this is the problem of small ratings on large panels. As competition increases, audiences fragment and there are always:

- stations which always have low ratings,
- times when even large stations have low ratings.

This situation occurs increasingly within panels designed to measure mass audiences. Where stations are restricted by access such as for satellite or cable, panels representative of those sub-sections of the uni- verse can be recruited.

In the United Kingdom, homes with satellite or cable are broken out of the main panel and weighted as a network satellite panel. This provides around 1200 households and 3600 individuals, without any additio- nal boosting.

Such is the fragmentation within these homes however, that many stations record permanently low wee- kly audiences. These data are robust within satellite homes for the terrestrial channels, for total Sky and other aggregations of channels. Some channels, however, regularly record an average of one or two minu- tes of viewing per head each week. In a sense these figures are reliable in that they always show very low audiences week after week.

Where the problems arise, for all channels, is when individuals spots or programmes are considered. For many of the larger satellite stations, even within the satellite universe, many ratings at individual times are 1% or less, often 0.1% or less.

The sampling errors on these are enormous. For example, consider the largest satellite channel in the Uni- ted Kingdom. Amongst all housewives this channel took a 4.5% share of all viewing in satellite receiving homes in a recent week (week ending 25th January 1998). (Note that the next largest satellite channel took only a 2.6% share.) In this particular week, two-thirds of this channel's programmes had housewife ratings of 1% or less and one-third had housewife ratings of 0.1% or less. The 95% confidence intervals on housewife ratings of 1% and 0.1% in satellite homes are 60% and 180% respectively. (Again these sampling errors assume the panel to be perfectly balanced; in reality they are larger.)

Two-thirds of the satellite channels reported by BARB never achieved any rating as high as 1% in this particular week. If audiences are expressed in terms of numbers of viewers, however, they take on a reality which belies their statistical bias. For example, a programme with a rating of 0.5% could easily lose all its audience from one week to the next purely as a result of sampling error. Amongst housewives in satellite homes (there are 6.6 million in the population) this represents a drop in the audience from over 30,000 to nothing at all. How can you lose 30,000 viewers from one week to the next? Because they represent small ratings with big sampling errors, the variability looks implausible.

What is the solution? This depends on the purpose for which audience research data are needed. Programming: it is certainly possible to see which are the most successful programmes even from highly unstable small ratings data for small stations. Judgment is considerably improved by managing several weeks' data together.

The precision of assessment for programme audiences is less than for large rating channels but the need for more subtle distinctions may be less. The differences between programmes may even become more deviant because they may be less affected by competition.

Buying and selling advertising: here any attempt to work on an individual spot time may be a waste of time. Improved assessments may be made by:

- using data averaged over time,
- assessing whole schedules either within a channel but more realistically across a number of channels.

For advertisers on niche channels representing a special market, e.g. a computer channel, advertisers may well wish to get an idea of the best times to advertise. They are, however, more likely to buy a schedule and compare the direct response with campaigns in other media. It is possible that the

more specialized the market, the less precise audience estimates are required.

Viewing to stations with restricted universes

With panels covering the whole television universe, some restricted universes may be represented with only small sample sizes and there may be difficulties in representing their characteristics. Restricted uni- verses in this sense occur in a number of ways.

Limited regional coverage

In the United Kingdom some cable franchises have small catchment areas. Within BARB, cable as a whole is represented by a panel which is a specially weighted sub-set of the main panels. This reports separately on cable stations which have a wide geographical coverage. Small regional cable franchises may, however, wish to know the patterns of viewing to the station mix which they offer and their own local cable servi- ces. Their coverage by a network people meter sample is negligible. It would be possible but not economi- cally viable to recruit a special people meter panel for the area. Instead, in the United Kingdom, the Cable Research Group has commissioned, outside BARB, periodic two-week paper diary studies using diary formats not unlike those used for much radio research. Some of this work is described in a later section. This kind of situation is likely to increase for the future.

Most regional television structures end up with regions that vary in size. This often means that the smaller stations would not have an adequate sample based upon proportionate regional sampling. The solution is usually disproportionate geographical sampling or a federation of regional panels.

Whilst strict statistical logic would demand equal sized panels everywhere the money at risk argument often leads to compromise whereby larger areas may be capped off at a certain limit and smaller areas boosted up. The United Kingdom is an example of this illustrated by three of the thirteen regional areas (see Table 2).

TABLE 2:
EXAMPLE OF REGIONAL AREAS WITHIN THE UNITED KINGDOM

	Percent of National Population	Percent of Meters	Sample Size Households
London	20.2%	11.7%	525
North East	5.3% 6	.1%	275
Border	1.2%	2.2%	100

One of the problems is that there is sometimes a tendency to treat all the areas as having the same cu- rrency available. Thus the sample size for Border hardly warrants pursuit of spot by spot buying, certainly not for sub-groups, but it sometimes happens. Possible remedies include selling by schedules or aggrega- ted ratings and factoring discussed elsewhere.

An example of equal sized regional panels is Belgium with two equal panels of 750 households for each of the Flemish and French speaking parts. Paradoxically, although the national sample is about a third of the United Kingdom's, the actual panels used for trading are larger. A regional programming and trading structure is one situation where, even with mass audience channels, the use of people meter panels leads to statistical strain. It seems likely, however, that there is a general trend towards trading television adver- tising in larger units which may ease this.

Services based upon new technology

The advent of satellite transmissions was a past example of this. There it was possible to recruit a special sample of satellite receivers who had a vastly increased range of programme choice compared with te- rrestrial reception. In the United Kingdom there was initially a separate panel but ultimately a specially weighted sub-sample of the main people meter panels was used. This currently provides a sample of around 1200 households.

We expect that digital television will be measured in the same way in the United Kingdom. This could ini- tially involve special extra panels for satellite digital, terrestrial digital and even digital cable services since there is very likely to be much initial overlap between this mode of reception. Such panels could be merged with analogous panels when the universe is large enough.

These new developments present special small audience problems:

- Universes. It is easy to define access to equipment but harder to measure it when it starts from zero and may rise rapidly and erratically. Within the broadest definition of having the reception equipment, however, there is the added complication of subscription packages in- corporating different channels. These are subject to an additional variability from take-up and churn within the variability of the equipment universe. Universes have been generally obtai- ned from some independent survey source. An establishment survey, for example, for a slowly changing terrestrial source can provide:
  - a reliable estimate of universe size,
  - a profile of demographic and often characteristics of the universe,
  - a source of households for panel recruitment.

With new services such as digital transmissions the new problems are that the universes are:

- initially very small,
- dispersed through the population,
- changing very rapidly; for individual stations up and down, highly complex in terms of combinations of channels received.

These characteristics mean that no representative sample is likely to be large enough, afforda- ble on a continuous basis nor even able to be processed quickly enough. This means that some alternative approach is necessary. In practice broadcasters will have exact databases showing who is paying for and receiving what on a near-daily basis. It would be logical to use this. The objection is sometimes raised that broadcasters might inflate the figures and/or be able to detect the identity of the panel home. It will be necessary to counter this by some form of independent auditing and access to the database.

It will also be necessary to create new legal safeguards and protection against interference with panel homes. The use of a broadcaster's database does not uniquely create this problem, it is there from the moment that the broad- caster gets into a direct one-to-one on-going relationship with the households in the audience. Ultimately intelligent digital decoders will be able to record station viewing data in great detail on large samples. This will need some individual viewing data from smaller samples modeled onto it. This would solve both the universe and the small audiences problem for marketing strategies based on type of household rather than type of individual.

- Audience fragmentation. New technologies bring more choice and greater fragmenta- tion. Digital television is likely to extend the range of channels from the thirtieth or more of satellite into the hundreds. Different channels will show the same films at different times to provide a near video-on-demand service. Necessarily, most audiences will be very small, a further extension of the issues discussed earlier. This means that for all but a few channels the assessment of individual spot ratings will be pointless. We would expect to see television planning and assessment based upon aggregated data probably involving selling of schedules comprising many small ratings spread across a range of channels.

Once again the receiving of schedule audience measurement becomes of crucial importance.

- Panel structure. As services develop those which can afford people meter panels will pro- bably do so but initially, with relatively small sample sizes. It will also be necessary to control panel membership in terms of:
  - combinations of channels received,
  - novelty effects, i.e. length of ownership.

This will require complex weighting reducing effective sample sizes even more and exacerba- ting the problems of fragmentation discussed above. Only data aggregated across channels and/or times will be robust.

When choice gets this complex and with the development of electronic programme guides where pro- grammes can be chosen without channel awareness, the option of using alternative techniques such as paper diaries and recall will no longer exist.

The industry will therefore have to get used to using audience measurement data for small audiences from small people meter panels in a responsible way using aggregated data. Until that is the intelligent decoder is able to give precise set range data on large samples.

Programming needs will vary according to the nature of the channel. Even with very small share channels it is possible to see which are the most popular programmes, particularly if schedules are consistent and weeks averaged together. BARB currently publishes Programme Top Ten for many small share channels, which are robust, in the sense of similar programmes appearing week after week. Any subtlety in terms of small differences between audiences would, however, be impossible. Programmers wishing to fine tune programmes or schedules would probably gain more from qualitative research among viewers to their programmes.

Ethnic or language minorities

Ethnic or minority language groups are likely, by definition, to have low representation on general repre- sentative samples. There are likely to be special sampling problems in that such groups are both clustered but not exclusively confined within any geographical boundary. Universe

measurement and sample selec- tion probably requires large scale surveys and some allowance made for differential non response. Even then the sample may not be adequate to provide reliable data for channels servicing these groups.

One solution is a separate people meter panel. This occurs in the United Kingdom for Welsh speakers, measuring audiences to S4C. There is no separate panel for Gaelic speakers in Scotland. Response to pro- grammes in Gaelic is studied through qualitative audience appreciation studies. The Gaelic channel in the Republic of Ireland has Gaelic speakers as a possible audience sub-group on the main panel. In Germany foreigners have been excluded from the main television panel universes but may now be represented by a separate panel.

Whether an ethnic minority or language channel has a separate panel is largely a matter of economics. Cable and the development of digital services will make niche channels possible for smaller ethnic groups.

The limited data available from mainstream panels may mean that alternative techniques have to be used. Viewing to minority interest stations, intermittent interest channels

The multiplication of choice will give rise to channels which have a very restricted 'niche' appeal but one which is not identifiable by region, language or ownership of equipment. The channel would be based upon interest in a topic such as natural history, or history. An intermittent interest channel would be a weather or traffic channel. These stations are essentially general in potential appeal but likely to achieve a low reach and share. They suffer from the general small channel problems and the solutions lie in aggregation as already discussed.

For minority stations where there is a marked minority appeal, there may be problems not only of sample size but also of panel bias. The chance of over or under representation of a minority interest group could stay with the panel for some time. Here alternative techniques with larger independent samples may help.

Sampling errors for small audience measurement

Small Audience Measurements

In the United Kingdom, the BARB TV people meter system currently reports audiences to five national terrestrial channels, one local terrestrial channel (S4C in Wales), thirty-eight channels delivered by satellite and cable (this number is constantly changing) and five cable exclusive channels. Typically, the national terrestrial channels account for the following audience shares (see Table 3).

TABLE 3:
AUDIENCE SHARES

BBC1	30%
BBC2	11%
ITV	33%
Channel 4	10%
Channel 5	3%

Of the thirty-eight satellite/cable channels, only two account for more than 1% of all viewing. The full distribution is as follows (see Table 4).

TABLE 4:
DISTRIBUTION OF SATELLITE/CABLE CHANNELS

Share	Number of Channels
1-1.5%	2
0.5-1%	6
0-0.5%	30

In total, the five cable exclusive channels account for less than 0.5% of all viewing, as does the local te- rrestrial channel S4C.

A large number of cable exclusive channels are not reported by the BARB system because the data is not considered to be sufficiently robust. (These are catered for outside the BARB system.) The arrival of digital TV later this year will generate yet another small audience measurement requirement.

The small channel shares are partly due to the large numbers of channels available and partly because only 34% of the population have access to cable or satellite and only 13% are cable exclusive.

In the United Kingdom, the national terrestrial channels are also commonly reported on a regional basis, in terms of either the twelve BBC editorial regions or sixteen ITV areas. This is another key dimension resulting in small audiences. For example, if 10% of the population live in a particular ITV area, then the share of all TV viewing by the whole national population which is accounted for by viewing to the ITV station broadcasting in that area is only 3.3% (i.e. 10% of the national ITV share of 33%). Effectively this is another example of a restricted availability channel because only 10% of the population has access to that particular regional ITV station.

The last dimension which results in audience fragmentation is the need to report on demographic categories, ranging from simple male/female splits to very tightly defined age groups. For example, a 10% penetration sub-group's viewing to an ITV station in an area containing 10% of the population would only account for 0.33% of the total national populations' viewing.

Of course it is not normal practice to report such fragmented audiences as percentages of the total natio- nal population base. Therefore the percentages are not normally seen as such small numbers. However, this way of presenting the audiences is a useful lead in to the consideration of sampling errors and the relative reliability of the various audience measurements.

Sampling Error Study

BARB and RSMB have recently completed the first phase of a major study of the sampling errors asso- ciated with the various audience measurements produced by the TV people meter panel in the United Kingdom. This is considered to be an essential contribution to the sample design component of the future audience measurement specification. The theory has been developed to allow the calculation of sampling errors for many different audience measurements and to compare the performance of perfectly balanced proportionate and disproportionate designs and to assess the effect of weighting used to correct for the usual panel imbalances that exist within an operational system.

The calculation of sampling error

Several papers have been written concerning the components of sampling error and the methodology for their calculation (eg. Schillmoeller, 1992; Boon, 1994 and Twyman and Wilcox, 1996).

The calculation of sampling error takes account of the variability in the audience measurement between individuals, the sample size, clustering within households and weighting. These factors and their effects can be different for each measurement, for each channel, for each demographic category and each area base.

It was necessary to consider the whole range of different audience measurements because some will have smaller sampling errors than others and therefore may be more useful in the small audience situation:

- average ratings and channel share for all-time, time segments (day-parts), quarter hours and individual minutes;
- channel reach;
- programme, commercial break and individual commercial spot ratings;
- reach and frequency analysis;
- daily, weekly and four week averages;
- change over time, from month to month and from year to year.

The actual analyses were based on a limited number of channels using two ITV area panels. For the purpo- ses of this paper, the results have been interpreted to provide approximate sampling errors for a number of hypothetical situations.

All sampling errors have been converted to 95% confidence intervals. This means there is a 5% chance that the audience measurement estimate is more than one confidence interval from the 'true' value of the audience measurement.

Sampling errors for proportionate panel designs

Because network based channel share encapsulates the extent of each small audience situation, a useful start point is to consider the sampling errors on channel shares for the types of viewing situations descri- bed in earlier.

TABLE 5:
CHANNEL SHARE SAMPLING ERRORS - ALL ADULTS 16+, NETWORK

		95% Confidence Interval		
Channel	Share	Single Minute	Single Day	4 Week Average
BBC 1	30.0% +	_ 10 %	± 1.4%	± 0.9%
BBC 2	11.0%	+ 19%	+ 2.3%	+ 1.2%
ITV	33.0% +	_ 9%	± 1.2%	± 0.8%
Channel 4	10.0%	+ 20%	+ 2.1%	+ 1.2%
Channel 5*	3.0% +	_ 30%	± 5%	± 3%
Satellite	1.0-1.5%	+ 50%	+ 8%	+ 5%
Satellite	0.5-1.0% +	_ 65%	± 10%	± 6%
Satellite*	Under 0.5%	+ 90%	+ 15%	+ 8%
S4C*	0.3% +	_ 90%	± 15%	± 8%
Cable only*	Under 0.25%	+ 100%	+ 20%	+ 10%

Sampling errors have not yet been calculated for Channel 5, S4C nor any of the cable channels so interpolations have been made. It should also be noted that sampling errors have not been calculated for any satellite channels with less than 0.1% share. The single minute sampling error relates to peak-time.

Sampling errors have not yet been calculated for Channel 5, S4C nor any of the cable channels so inter- polations have been made. It should also be noted that sampling errors have not been calculated for any satellite channels with less than 0.1% share. The single minute sampling error relates to peak-time.

The BARB panel in the United Kingdom is currently nearly 4500 homes with 8600 adults. If this were to be of a proportionate design and perfectly balanced (i.e. no weighting were required) then the shares of viewing would have the following sampling errors. These are shown for a single minute, a single day and then for a four week average in Table 5.

At the next level of fragmentation (see Table 6), consider sampling errors for an average 10% penetration demographic sub-group or a 10% penetration geographical region. The network based channel shares are all divided by ten. The sampling errors above increase as the sample size decreases - i.e. multiply by .

TABLE 6
CHANNEL SHARE SAMPLING ERRORS - 10% SUB-GROUP OR REGION

		95% Confidence Interval		
Channel	Share	Single Minute	Single Day	4 Week Average
BBC1	3.0%	± 32%	± 4%	± 3%
BBC2	1.1%	± 61%	± 7%	± 4%
ITV	3.3%	± 29%	± 4%	± 3%
Channel 4	1.0%	± 64%	± 7%	± 4%
Channel 5*	0.3%	± 96%	± 16%	± 9%
Satellite	0.10-0.15%	± 160%	± 25%	± 16%
Satellite	0.05-0.10%	± 208%	± 32%	± 19%
Satellite*	Under 0.05%	± 288%	± 47%	± 25%
Cable only*	Under .025%	± 320%	± 63%	± 32%

For highly targeted channels this table must be interpreted carefully. This is because it would not be nor- mal practice to analyze 'average' demographic sub-groups. More often than not the key target sub-group would account for a large proportion of the channel's total audience. In this situation the percentage sampling error will not increase as much as the decrease in sample size suggests because the sub-group has higher viewing levels. In fact we can hypothesis that if we do have a situation where the whole of a channel's audience is attributed to one key demographic sub-group (e.g. 16-34 year olds and a 'young' music channel) then the percentage sampling error for the sub-group is the same as for all adults.

Empirical evidence for alternative audience measurements and with a more sophisticated sampling error calculation is not always so consistent. However the relationship seems to be proved in terms of orders of magnitude - certainly the sub-group would not have a sampling error 3.2 (=) times as large.

In order to complete the series of audience share sampling error tables, Table 7 is for an 'average' 10% penetration demographic sub-group within a 10% penetration region:

TABLE 7
CHANNEL SHARE SAMPLING ERRORS - 10% SUB-GROUP IN A 10% REGION

		95% Confidence Interval		
Channel	Share	Single Minute	Single Day	4 Week Average
BBC1	0.3%	± 100%	± 14%	± 9%
BBC2	0.1%	± 190%	± 23%	± 12%
ITV	0.3%	± 90%	± 12%	± 8%
Channel 4	0.1%	± 200%	± 21%	± 12%

The original network based channel shares are all divided by 100 and the confidence intervals are now ten times as big as those shown in the national/all adults table.

Individual spot ratings vs. schedule averages

Having used channel share and 'average' demographic sub-groups to demonstrate in principle how large sampling errors can be in small audience situations, it is important now to consider 'real' demographic sub- groups and the key audience measurements used in the buying and selling of advertising. 'Real' demogra- phic sub-groups do not have average levels of variability nor average levels of clustering within households. The key audience measurements relate to individual commercial spots and whole advertising schedules.

First consider the sampling errors for the ratings to a selection of individual minutes broadcast on ITV and Channel 4, shown in table 8. The sample base is the London ITV area panel which comprised 530 homes, delivering 459 men but only sixty-two men aged 16 - 24 years. The analysis period is November 1996. This illustrates the small audience measurement situations arising from restricted areas, small demographic groups and times of low viewing.

TABLE 8:
SAMPLING ERRORS FOR INDIVIDUAL MINUTE RATINGS

Channel	Time	All Men M		en 16-24	
		TVR	95% c.i.	TVR	95% c.i.
ITV	7:45am	1.3	± 39%	2.5	± 95%
	1:45pm	5.1	± 21%	3.8	± 68%
	8:30pm	11.0	± 14%	7.8	± 44%
CH4	7:45am	0.5	+ 81%	0.0	-
	1:45pm	0.4	+ 77%	0.0	-
	8:30pm	5.0	+ 23%	0.0	-

All the sampling errors are large, even for the peak-time ITV All Men rating. The sampling error for men aged 16-24 years is huge. The zero Channel 4 ratings actually emphasize the small sample problem - even a Men 16-24 rating of 5% (as achieved within All Men) would be the result of only three individual panel members viewing.

By averaging over time, even within a continuous panel, there will be significant reductions in sampling error. This fundamental theory originally expounded in a report prepared by Arbitron (1974) has been de- monstrated in several published papers (e.g. Wilcox and Reeve, 1992). For example, average ratings over four consecutive Mondays have the sampling errors shown in Table 9.

TABLE 9:
SAMPLING ERRORS FOR AVERAGE RATINGS - FOUR MONDAYS

Channel	Time	All Men		Men 16-24	
		TVR	95% c.i.	TVR	95% c.i.
ITV	7:45am	1.2	± 24%	1.6	± 57%
	1:45pm	3.5	± 15%	2.1	± 45%
	8:30pm	13.2	± 5%	7.1	± 19%
CH4	7:45am	0.4	+ 39%	0.1	+ 88%
	1:45pm	1.0	+ 13%	0.4	+ 43%
	8:30pm	3.1	+ 10%	1.3	+ 33%

TABLE 10:
SAMPLING ERRORS FOR TOTAL SCHEDULE RATINGS

Schedule	Channel	All Men		Men 16-24	
		Total TVRs	95% c.i.	Total TVRs	95% c.i.
I	ITV	33	± 15%	39	± 25%
	Channel 4	19	± 18%	15	± 51%
	Satellite	4	± 26%	2	± 67%
	Total	55	± 12%	56	± 29%
II	ITV	148	+ 6%	87	+ 19%
	Channel 4	71	+ 9%	54	+ 24%
	Satellite	14	+ 18%	16	+ 52%
	Total	233	+ 5%	157	+ 16%
III	ITV	140	± 7%	116	± 18%
	Channel 4	36	± 9%	28	± 24%
	Satellite	10	± 19%	28	± 33%
	Total	186	± 6%	173	± 15%
IV	ITV	254	+ 6%	134	+ 20%
	Channel 4	171	+ 6%	148	+ 21%
	Satellite	36	+ 17%	55	+ 28%
	Total	461	+ 5%	337	+ 15%
V	ITV	174	± 7%	88	± 26%
	Channel 4	64	± 9%	32	± 29%
	Satellite	17	± 20%	21	± 58%
	Total	256	± 6%	141	± 21%

Although there is some variability in the relationship with the single minute rating sampling errors - to be expected with real data and small samples - on average the percentage sampling errors are halved. We believe that many broadcasters are already using such averages for planning purposes.

This principle can be extended to whole schedules where in general we will find even greater reductions in sampling errors. Table 10 shows results for five schedules broadcast in November 1996, again based upon the London panel.

For All Men and for any schedule with a reasonable number of ratings, the sampling errors have reduced to a more manageable level. However, there does seem to be a plateau beyond which additional ratings will not result in further sampling error reductions. For All Men the minimum 95% confidence interval seems to be 5% whilst for Men 16-24 it is about 15%. This is approximately in line with their relative sample sizes although Men 16-24 are also more variable as a group.

However, the basic principle is clearly demonstrated: schedule total ratings have much smaller sampling errors than do individual commercial spot ratings.

Sampling errors for different schedule structures

A key question we have asked is how much the sampling error for schedule total ratings is dependent upon the composition of the schedule, i.e. is the schedule total ratings percentage sampling error high if the indi- vidual spots in the schedule have low ratings and therefore high percentage sampling errors? For example, is the sampling error for a schedule of ten spots with an average rating of 20%

the same as for a schedule of twenty spots with an average rating of 10%?

TABLE 11:
SAMPLING ERRORS FOR SCHEDULES WITH DIFFERENT STRUCTURES

Single Spot TVR	Single Spot % s.e.	Number of Spots	Total TVRS	Total TVRs 95% c.i.
20	2.2%	10	200	+ 5.9%
10	3.2%	20	200	+ 6.3%
5	4.7%	40	200	+ 6.4%
1	10.7%	200	200	+ 6.6%
0.5	15.2%	400	200	+ 6.6%

So in theory the total ratings sampling errors are independent of the size of the ratings which make up the schedule. Certainly the variations in the percentage sampling errors are nothing like the variations in the single spot percentage sampling errors. In practice the equality of the schedule total ratings sampling errors will depend upon correlations in viewing between spots.

We can get a feel for whether or not this works in practice by comparing the ITV and Channel 4 compo- nents of each schedule. On average, single ITV ratings are about three times as high as single Channel 4 ratings. In Table 12 the schedule components have been ranked according to total ratings delivered.

TABLE 12:
SAMPLING ERRORS FOR ITV AND CHANNEL 4 SCHEDULES

Schedule	Channel	All Men	
		Total TVRs	95% c.i.
IV	ITV	254	± 6%
V	ITV	174	+ 7%
IV	CH4	171	± 6%
II	ITV	148	+ 6%
III	ITV	140	± 7%
II	CH4	71	+ 9%
V	CH4	64	± 9%
III	CH4	36	+ 9%
I	ITV	33	±15%
I	CH4	19	+18%

Although the evidence is not exactly in line with the hypothesis that schedules with equal total ratings have equal sampling errors, it is certainly not the case that a schedule of low rating/high percentage sampling error spots will have correspondingly high sampling error for the total ratings. But what about a restricted availability channel?

To generate the same impacts, a restricted availability channel with a 20% penetration would need to generate ratings five times as large within its own universe, i.e. 1,000 ratings in total. The equivalent schedule structures and theoretical sampling errors, now based upon a sample of only ninety-two men, are shown in Table 13.

TABLE 13:
SAMPLING ERRORS FOR SCHEDULES ON RESTRICTED AVAILABILITY CHANNELS

Single Spot TVR	Single Spot % s.e.	Number of Spots	Total TVRS	Total TVRs % s.e.
100	-	10	1000	-
50	2.4%	20	1000	+ 4.7%
25	4.2%	40	1000	+ 5.7%
5	10.5%	200	1000	+ 6.4%
2.5	15.1%	400	1000	+ 6.5%

Even with the ridiculously high 50 rating spots, the order of magnitude of the sampling errors is preserved. This time the empirical evidence shown in Table 14 is very thin, with only two satellite schedules coming close to the terrestrial channels' total ratings levels.

TABLE 14:
SAMPLING ERRORS FOR SATELLITE SCHEDULES

Schedule	Channel	All Men	
		Total TVRs	95% c.i.
IV	Satellite	36	± 17%
V	Satellite	17	± 20%

However, these seem to fit in with the hypothesis of equal sampling errors for equal schedule total ratings. The last hypothesis considered is: Do schedules with equal impacts have the same sampling error for total ratings irrespective of the sample size of the demographic sub-group analysed? This is analogous to the restricted availability channel situation.

Again we can get a feel for whether or not this works in practice by re-examining the schedule sampling errors. This time the Men 16-24 total ratings are multiplied by 62/459 (the ratio of the sample sizes) to form percentages of the All Men universe (equivalent to a comparison of schedule total impacts) before ranking according to the total ratings delivered, as shown in Table 15.

TABLE 15:
SAMPLING ERRORS FOR MAIN CATEGORIES VS. SUB-GROUPS

Schedule	Channel	Category	Total TVRs	95% c.i.
I	Total	All Men	55	+ 9%
IV	Total	Men 16-24	46	+ 15%
III	Channel 4	All Men	36	+ 9%
IV	Satellite	All Men	36	+ 17%
I	ITV	All Men	33	+ 15%
III	Total	Men 16-24	23	+ 15%
II	Total	Men 16-24	21	+ 16%
IV	Channel 4	Men 16-24	20	+ 21%
I	Channel 4	All Men	19	+ 18%
V	Total	Men 16-24	19	+ 21%
IV	ITV	Men 16-24	18	+ 20%
V	Satellite	All Men	17	+ 20%
III	ITV	Men 16-24	16	+ 18%
II	Satellite	All Men	14	+ 18%
II	ITV	Men 16-24	12	+ 19%
V	ITV	Men 16-24	12	+ 26%
III	Satellite	All Men	10	+ 19%
I	Total	Men 16-24	8	+ 29%
II	Channel 4	Men 16-24	7	+ 24%
IV	Satellite	Men 16-24	7	+ 28%
I	ITV	Men 16-24	5	+ 25%
I	Satellite	All Men	4	+ 26%

Summary

Many applications of TV people meter panel data result in the need to measure small audiences. These may involve regional or demographic sub-group analysis as well as low rating or restricted availability channels. In these situations it is important to understand the sampling errors involved so that the best use of existing panel data is made.

The sampling errors associated with audience measurements of individual minutes or commercial spots are often huge. In the context of advertising schedules, any attempt at optimizing the choice of individual spots is often unjustified.

However, it is well known that the total ratings for whole schedules have much lower sampling errors than the individual spots within a schedule. In fact it is broadly true that schedules with equal impacts have equal sampling errors irrespective of the size of the individual spot ratings or the sample size of the sub-groups analyzed. Of course there are limiting situations in which this equality breaks down, but these would correspond to unusually heavy advertising on an individual channel.

Undoubtedly this finding will be useful in many situations. However, it cannot be allowed to generate complacency. In practice, a schedule on a low rating, restricted availability channel would never generate total impacts for a sub-group which were equal to those for a main category on a high rating, national channel.

Within the existing panels, there are measurements which provide a significantly more robust basis on which to trade advertising air time. However, in many cases there is still no substitute for increased sample size.

Alternative measurement methods for low penetration channels

Choices

A recent paper (Franz 1997) points out that small rating stations may get neglected in media planning because of their low representation on people meter panels. He suggests using independent samples collecting data, say monthly, and capable of being aggregated to large numbers of respondents in a year.

One advantage is that a large sample size made up of independent samples reduces bias which may be significant for small stations on a permanent panel. Out-of-home viewing may also be included in the measurement. He advocates normalizing the viewing levels to panel levels so that data can be used com- parably (presumably separating out-of-home viewing). The use of data aggregated over time would mean that the data would be for strategic planning and the panel data would provide some tactical information.

The techniques listed by Franz for a strategic television monitor are:

- personal interviews: paper or CAPI,
- computer aided telephone interviews,
- self-completion diaries.

We have a case history to report from the United Kingdom using self-completion diaries, not in the con- tinuous way suggested by Franz but as periodic snapshots.

Broadband Cable Audience Diary Research: A Case History

Prior to November 1997, the BARB TV people meter panel operation in the United Kingdom did not publish any audience estimates based upon the broadband cable universe because the sample sizes avai- lable were considered too small. Even now, only the five larger cable exclusive channels are itemized in the reporting system. Therefore, since January 1996, the Cable Research Group in the United Kingdom has commissioned RSMB to conduct periodic diary based studies to fulfill the broadband cable industry's audience measurement requirements. So far, four such studies have been completed (January 1996, Sep- tember 1996, March 1997 and September 1997) and two more are due in 1998 (March and September). It must be acknowledged that a paper diary is an inferior data collection mechanism when compared to a people meter. However, the counter-argument is: what is the point of having a very precise measurement of small audiences in only a very small

sample people meter panel with consequently huge sampling errors? Because it is cheaper and larger samples are therefore more affordable, a diary based study can be a more cost effective solution. Significantly the Cable TV (CATV) audience research has been formally approved by the Institute of Practitioners in Advertising (IPA) and generally accepted as providing a valid audience measurement.

The latest study (September 1997) was based upon a sample of 1300 adults and 400 children, each com- pleting a two-week quarter hour viewing diary covering all channels available in broadband cable homes. Whilst this sample size is effectively double that available from the BARB panel, we should not pretend that this completely solves the small audience measurement problem. The sampling errors for individual channels are still large. However, the value of the CATV survey is not all about increased sample size:

The diary sample is selected from an establishment survey of 2,500 households. This provides up-to-date information about the penetration and demographic profile of each broadband cable channel.

Identification of the cable channels received by each diary respondent allows analysis of viewing behaviour within receivers of each channel. This is not possible within the people meter panel operation.

Following the diary recording period, each respondent completes a leave behind question- naire. This is designed to collect information on usage of other media, opinions of individual channels and impressions of cable operator services, information which could not be collected from an audience measurement panel. In this way, the service is tailored to the needs of the members of the Cable Research Group.

By boosting the sample it is possible to provide audience measurement data for individual cable operator areas.

A potential disadvantage of the short term diary study is its inability to measure schedule reach beyond two weeks. This is overcome with the usual probability modeling techniques which are commonly emplo- yed within radio and press research.

Practical Reductions in Variability - Analysis of Variance

For applications of the TV audience measurement data which involve comparisons of sub-group ratings between regions, the sampling error approach to the assessment of variability reduction is appropriate. However, for applications which involve change over time within a single region, it must be noted that a component of the sampling error comes from the initial selection of the sample. When this sample is used on a continuous basis as a panel, the initial recruitment sampling error is equivalent to an ongoing ‘bias’. The resulting sampling errors on measurements of change over time are consequently smaller.

The analysis of variance procedure is designed to generate a practical rather than a theoretical measure- ment of the reduction in variability achieved through factoring. Published and factored ratings are calcu- lated for every quarter hour, for every channel, for every day, for every week and input into the analysis of variance procedure.

After allowing for as many known 'systematic' variations as possible (e.g. the daily quarter ratings pattern, the differences between channels) and their interactions, the analysis of varian- ce procedure calculates a residual variance. This is taken to be the average variability for any particular quarter hour measurement and is used to compute the associated coefficient of variation for a typical quarter hour rating. This is analogous to the percentage sampling error for a quarter hour rating. Then we can calculate the percentage reduction in this coefficient of variation for factored ratings against published ratings. Example results for London and shown in Table 17.

TABLE 17:
PRACTICAL REDUCTIONS IN VARIABILITY - LONDON

	Penetration of Main Category	Reduction in Sampling Error	Equivalent Sample Increase
Housewives with Children	29%	17%	x1.5
Women ABC1	55%	6%	x1.1
Men 16-34	36%	14%	x1.4
Women AB	24%	25%	x1.8
Men 16-24	14%	35%	x2.4

So in terms of change over time, the reductions in variability are still worthwhile if not so large. The full benefits of factoring will only be realized in comparisons between regions when the initial recruitment sampling error component is also relevant.

Potential Bias

In practice it is very difficult to determine whether or not factored results are biased. The prediction error will be a mixture of model bias and random error which are difficult to untangle due to the large sampling errors associated with the actual sub-group measurements. All we can do is compare factored and actual results at various levels of detail and to search for exceptional differences. If exceptional differences are always at times when the regional programming is different to the network, then there may be a problem. Otherwise we have to judge the relative credibility of factored and actual results. Remember that in many cases factoring is designed to replace 'unbelievable' and erroneous results with more credible audience measurements - by definition these would be different.

At the highest level of aggregation, Table 18 compares factored and actual four week all-time average ra- tings for Total TV and ITV in London in March 1996.

All these differences between factored and actual ratings are within sampling error. The largest differences are for Women AB. However, at this time the actual data showed that Women AB viewing

in London was 20% lower than in the whole network. Although viewing levels in London are expected to be lower, the factored data seems to provide a more credible result.

TABLE 18:
FOUR WEEK AVERAGE RATINGS - FACTORED VS. ACTUAL - LONDON

	Total TV	ITV
Housewives with Children	+1%	+1%
Women ABC1	+1%	+3%
Men 16-34	-3%	-4%
Women AB	+7%	+8%
Men 16-24	-2%	-2%

At greater levels of detail, the differences factored and actual ratings are obviously greater but still within sampling error. Another way to evaluate the factoring model is by examining exceptional differences at the quarter hour level.

For example, amongst Men 16-24 in London, the biggest difference between factored and actual quarter hour ratings was on BBC1 at 7:45pm on Thursday 21st March. At this time the actual rating was 13% and the factored rating was 26%.The first thing to note is that the same programme was being shown in London and across the whole network - this is not a bias caused by inconsistent programming. To put this exceptional difference into context, Table 19 shows the actual and factored ratings in adjacent weeks:

TABLE 19:
EXCEPTIONAL DIFFERENCE - LONDON - MEN 16-24, THURSDAY 7:45-8:00PM

	Actual Rating	Factored Rating
Week 1	21	25
Week 2	21	30
Week 3	13	26
Week 4	21	27

In this case, the factored rating provides a more credible result in relation to the adjacent weeks, a finding repeated for all the exceptions examined so far. However, it should be noted that our examination of ex- ceptions has been based upon factoring from a reduced network panel which may minimize programme schedule effects.

Summary

The factoring approach to small area sub-group audience measurement is still under test in the United Kingdom. The advantages are significant in terms of reduced variability because factoring is equivalent to adding between 50% and 100% to the current panel sample sizes but at virtually no additional cost. Across a wide range of sub-groups and 'difficult' areas, we have so far found no evidence of bias in the factoring model. Analysis of exceptions always points to more credible factored results and factoring is no worse during times of inconsistent programming between a region and the network. The potential disad- vantages are that unforeseen changes in regional

programming policy could disrupt the factoring principle and that unfactored sub-group data would always be available to support any criticism of factored results. The issue of potential bias is still under investigation and if the results are positive, then factoring could provide a real solution to the small area sub-group audience measurement problem.

Summary and Conclusions

1. Mass audience commercial television channels created the need for metered panels, ultima- tely using people meters almost universally. People meters measure audience movements very precisely in terms of time, necessary for advertisement audiences but at the expense of sample size. Trading in television has been initially centered on the audiences to single spots.

2. Sample size has become a severe limitation, in relation to the way in which the medium has developed, with requirements to measure ever smaller audiences. The most extreme problems are for advertisers but occur for the programming side as well.

3. This paper distinguishes between different ways in which small audiences occur, considers the reliability of the data from existing systems (i.e. sampling error) and suggests possible strategies for dealing with the problem.

Small audiences occur increasingly within mass audience research systems for:

- arge stations at off peak times and for small sub-groups,
- smaller stations operating within the same universe.

4. A great deal of effort and money is wasted pursuing the single spot philosophy in situations where data are unreliable. The problems occur much higher up the scale of audience size than is always realized. The paper gives examples of sampling errors to demonstrate this.

5. The solutions we suggest are:

- it is worth considering whether the extra cost of increasing sample sizes might in fact save money.
- planning, trading and accountability need to move away from single spots to aggregated data either over weeks for single times or across whole schedules.
- the use of factoring for sub-group data is examined for the special case of a regionally fragmented network system.

6. Digital television will create an initially small but important growing universe. Undoubtedly this will require, initially separate, boosted people meter panels. The number and complexity of channel choice, however, will create audience fragmentation. People meter data will have to be used in an entirely different way. This will involve setting limits to the reach and share of channels. Most advertising will need to be assessed on aggre- gated data and probably schedules, extending across a range of channels. Variations in spot audiences will be meaningful in only a small number of cases. Some programming data will be useful if aggregated over time.

7. Channels available to other smaller universes where meters are unaffordable, in some cases, can

use alternative techniques such as paper diary panels or recall. These are ideal for evolving markets where a snapshot at a point in time provides the clearest understanding of a potential audience's response to a channel.

8. For markets which have reached a relatively stable position, surveys accumulating large samples over time may provide the basis for strategic decisions, potentially providing more reliable representation of minority interests. The problem will be the growing complexity of choice and the use of electronic programme guides which may undermine the element of awareness and recall involved in non-meter techniques.

9. We believe that a crucial principle has been put forward in this paper. Sampling error is fairly similar for the same number of rating points no matter whether arising from a single spot or a schedule. Measurement of small audiences can therefore become as reliable as for large audiences when the small audiences are combined together.

10. So for the fragmented audiences of the future, research systems have to change and also the ways in which the research is used. Research users cannot go on looking at smaller audience forms by turning up the magnification of a limited microscope and seeing ever more blurred picture

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