

FINAL REPORT

Inhibited Exploration in Older Customers of Digital Services

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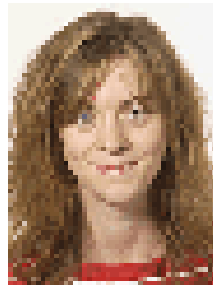
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Foreword

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The average age of the UK population and, therefore, of users of BBC television services is facing a period of rapid increase. Ensuring that TV services remain accessible to all members of the community has always been important to the BBC and been the motivated the delivery of extensive subtitle coverage for hearing-impaired viewers and, more recently, audio description services for the visually-impaired and in-vision signing for British Sign Language (BSL) users. These access services have had a tremendous impact on disabled viewers and remain a key component of the BBC's TV output. However, the profile of the audience's accessibility requirements is becoming more fragmented than was the case when subtitling, audio description and signing were launched, and the primary driver in this transformation is our audience's increased longevity.

In contrast to the well-defined, core sensory impairments that familiar access services have sought to compensate for, older people may typically have numerous more minor impairments affecting not only vision and hearing, but also memory, concentration and movement. The increasing incidence of accessibility problems arising from these impairments would be a challenge to television accessibility even if the television offering had remained essentially the same. But, since the introduction of Digital TV (DTV) in 1998, the user experience associated with watching and using television has undergone change at a remarkable pace. This combination of an ageing audience and a changing offering presents us with huge accessibility challenges if licence-payers of a range of abilities are to be as served consistently and well.

The essential issue is that the inherently multichannel nature of DTV in the UK has increased the amount and range of content available to a typical home many

times over. Effective navigation to and around programmes is, therefore, much more imperative a task for viewers. Coupled with the enhanced capabilities of DTV receivers, the increased volume of broadcast content has created an active market in Personal Video Recorder (PVR) functionality, exemplified by the Sky+ and Freeview Playback services. All this has had the effect of blurring the user experience distinction between viewing broadcast programme and material that was previously recorded. Also, DTV technology has allowed broadcasters to provide a range of interactive services, from digital text services succeeding teletext and information services to accompany programmes, to games and multiple screen coverage of events such as the Olympics.

Increased richness in DTV services can clearly lead to increased complexity in the user experience of television, and whilst it is apparent that digital and interactive TV services have become very popular generally, it is important that services are accessible to the whole audience. Older viewers, with their wide range of potential accessibility requirements, are in a particularly vulnerable position. In fact, this aspect of a potential 'Digital Divide' could go beyond the traditional educating, entertaining and informing roles of broadcasting since, in the next generation of DTV set-top boxes (STBs), internet interfaces will become widespread or even ubiquitous. With STBs having a much higher domestic penetration than personal computers, there will be increasing scope for providers of more critical services to migrate onto the STB platform. When making a hospital appointment, registering for benefits or even voting requires use of a STB, then the criticality of accessibility is very stark indeed.

The BBC wants interactive DTV services to be used by all licence-payers, regardless of age, and interactivity implies some need for the audiences to be comfortable and able to explore the available services. The results of this AHRC-supported project are helping us set the agenda for our accessibility work for older and disabled audiences. Most directly, we are following-up the original research with a second AHRC-funded project with Professor Payne and his colleagues, in which design strategies for encouraging exploration will be proposed. Longer term, the results will feed into a three-year EPSRC project that

we are supporting at the University of Dundee, which is looking at the effectiveness of particular assistive technologies to improve the accessibility of DTV.

The Inhibited Exploration project will yield tangible benefits for the BBC's research scientists, its interactive content producers and, ultimately, its audience, for many years to come.

Project outline and overview

Our project was founded on a simple argument, as follows:

Especially in the context of an ageing population, in light of the BBC's general interest in reaching all sectors of UK society, the population of older viewers is an important potential audience for novel digital interactive TV services.

Such evidence as there is suggests that take-up of interactive services among older viewers is less than it could be (Klein et al, 2003).

One important potential causal factor, and the one that has dominated work in the field of Accessibility of computer systems, is the relation between interface design and the various kinds of cognitive and perceptual decline that are associated with ageing. However, we were also aware that recent years had seen much design work, by the BBC and others, addressing this problem.

A second and quite separate causal factor might be in play, related to older viewers' motivations, in particular their propensity (or reluctance) to seek variety in their TV-oriented behaviour, and their prospective judgments of the value of interactive services.

In the light of this argument we proposed an empirical project in two phases. In the first phase we would interview older viewers in their homes to explore the current status of use of interactive services, and to try to gain qualitative appreciation of both interface barriers and motivational barriers to exploration of digital services.

In the second phase we would perform comparative experiments to directly test our rather speculative hypothesis that older viewers would seek less variety in their TV watching experiences than did their younger counterparts.

The project was performed very much in keeping with our proposal. There are some minor details of the proposal which required adaptation and compromise as we progressed – and the recruitment of our elderly participants was more demanding and time-consuming than we had anticipated. More particularly and importantly, our initial sketch of the experimental study was anticipated in a completely independent paper out of the USA, published after our project had begun! Fortunately, this published work confirmed our basic intuitions about variety seeking among older people, and allowed us to further focus on how the issues of interest might play out in the context of TV-watching choices.

A less dramatic reorientation of our work was to elaborate the importance of methods of time allocation in TV viewing, and the technology that supports such allocation. In looking at this issue we were influenced by the ethnographic work of Taylor & Harper (2003), who reported that TV viewing was typically divided into three phases – a casual phase, characterised by intermittent attention in parallel with other domestic chores, around tea-time; a focussed phase in mid-evening and a final more variable phase. Further, they reported that the focussed phase was likely pre-planned whereas the casual phase was more likely to be supported by channel surfing, sometimes augmented by electronic programme guides (EPGs). The BBC partners in the project were particularly interested in design of EPGs as part of interactive services, so in the light of these provocative findings, these issues took on additional weight in our research.

In total we successfully completed an interview study and three experiments, all of which have contributed to our understanding of older viewers exploration of interactive services. Our initial hypotheses were confirmed in some respects, but certainly not unambiguously – we believe that the relation between general motivational tendencies in elderly people and the particular characteristics of TV programmes and interactive services is more complex than our proposal imagined. We will discuss some of these complexities in this report.

We are pleased with the amount we have achieved in what, by the standards of this kind of empirical research, was a very-small scale project (11 months

funding for one graduate RA). As promised in the proposal, the empirical work has involved close collaboration between the academics and the BBC partners, and has led to a successful proposal for very small-scale follow-on funds to explore some of the practical implications for design of Electronic Programme Guides (EPGs).

Interview Studies

Participants

A convenience sample was recruited through advertisement at the following locations: a local bowls club, Cheshire Older peoples network (invitation letters were handed out at their AGM), Knutsford University of the third age (on their website and in their newsletter) and on the University of Manchester Research volunteering webpage.

We conducted interviews in 17 households – in 4 of these the interview was with a couple, in the remainder it was with an individual. Five of our participants lived alone. The average age of participants was 68.9 years, range 60-78.

Method

The primary aim of our interview studies was to gain some qualitative insight into the barriers to take-up of interactive services. In particular we set out to investigate how our respondents viewed the costs of exploration and the potential benefits of interactive services. We probed for cases of successful use of interactive services, and for barriers to the exploration of such services, such as ignorance, interface design or negative judgments of value.

We began each interview by trying to establish rapport, encouraging free conversation, by asking general questions about quantity and regularity of TV use. As noted above, we were interested in the suggestion by Taylor & Harper

that TV watching has a rather regular temporal structure, with TV behaviours varying according to domestic schedules.

All our interviews were fully transcribed, and the transcriptions were read and re-read to note responses related to our initial themes and the emergence of new and unanticipated themes. Because of the relatively small sample, we will treat our data qualitatively, using it to support, elaborate and suggest ideas for understanding the consumption of iTV services and issues for further research and design.

Findings

A very coarse summary of what we found might be glossed as follows. We found little evidence for interface barriers, or any other kind of inhibition on exploration of interactive services – although we did find some. On the contrary, we found a good deal of successful, enjoyed exploitation of interactive services. As we wondered in our proposal, it seems that the efforts in interface design have met with some success – certainly if we had seen our job as evaluating current access mechanisms for iTV for the elderly, we might have reported, in general, a very positive level of acceptance.

Beyond this coarse summary, our interviews confirmed some of our starting intuitions, tended to disconfirm others, and led to the consideration of new themes that we see as important for further research. All these themes are listed and discussed below.

Our discussion will begin with the themes that helped to structure our interview strategy. As ever with these issues, there is a difficult balance between prompting discussion of the topic of interest and putting words into our participants' mouths. However, we are satisfied that our interview strategy was successful at putting participants at ease. Typically, where direct questions were asked the answers were not as we had anticipated in our proposal.

Variety in TV watching schedule

We could find no evidence among our participants for any consistent segmenting of the TV-watching day into the characteristic periods outlined by Taylor & Harper. Instead, we found wide variety among our participants in terms of how much TV they watched, and when and how their viewing behaviour was focused.

Some respondents regularly watched TV for periods morning, afternoon and evening. Others had no regular schedule at all, but were entirely programme-driven - watching singular programmes they found particularly attractive.

Perhaps the simplest explanation of this discrepancy is that Taylor & Harper (2003) observed younger households, with at least one person working and with children at school – households for which the external constraints on temporal routines are much tighter than they are for our retired participants.

This is a simple, perhaps obvious difference, yet we feel it does seriously undermine the suggestion made by Taylor & Harper that services such as EPGs should reflect the temporal structure of domestic routines. If these routines don't exist for a substantial segment of the audience, then it is not clear how they can be exploited or adapted to in design

Variety in selection strategies and use of selection technologies

Some of our respondents were very planful – scheduling their programme consumption as much as a week ahead (and further for habitually watched series), or more usually, for the evening to come. These respondents typically used a paper guide of some sort . This heavily planned consumption was true of some relatively low-level watchers as well as more avid TV consumers. Other respondents reported much more ad hoc, real-time selection, based on channel-surfing, and in particular the use of EPG information of current broadcasts to augment or replace channel surfing.

We note a correlation between technology and method in this instance, and propose this as a general hypothesis (we lack the statistical power here to test the hypothesis)– EPGs are favoured for real-time decisions, paper guides for advance planning. In this regard, our interview data are in keeping with Taylor & Harper’s studies of younger families.

Usability and fear of failure as a barrier (or not)

In the proposal we reviewed work that suggested that usability concerns might underlie older viewers’ reluctance to explore interactive services. In particular we wondered about fear of reaching catastrophic states. However, we also noted that much work had been invested in interface design to try to ameliorate such problems.

The overall impression from our interviews is that this work has been very successful. We obtained many more positive reports of ease-of-use, and express lack of concern about catastrophic failure than we received complaints – and these few tended to be non-specific and past rather than current concerns.

I: “So you find it easy to use”

JB: “Very easy.”

SI : “Were you wary about pressing the red button at all?”

KL: “No it was very natural.”

There is one exception – response time. Many of our respondents reported having tried the red button, but found response too slow, and too *variably* slow to be worth persevering with:

L: “Sometimes the red button come up and I press the red button and nothing happens.”

Evidence against main hypothesis of depressed variety-seeking

We also proposed another cause for inhibited exploration of iTV services – depressed variety seeking. But again, we found little evidence for this in our interviews. Many of our respondents reported successful and enjoyable, if sometimes infrequent use of ‘red-button’ interactive services.

Several respondents were unaware of the full scope of interactive services, and this seemed due to ignorance rather than any more pernicious barrier. When informed about the services they more often expressed some interest.

J: "I think the interactive is a good thing and there's probably a lot more on there than we know about."

P: "Oh definitely, yeah, we are real suckers for birds...and we would certainly do the interactive bits with those."

The interviews support two main explanations for the difference between informed users (or discretionary non-users) of interactive services and those who are ignorant of what's on offer. (There may well be other causal factors at work, but these are the ones that are supported by our respondents' talk.) The first is the role played by the direct ‘Call-to-action’ signal, “Press the red button now for...” that appears on some programmes. The second is the importance of informal social transmission (another hypothesis we made explicitly in the proposal).

Call-to-action

The most common success cases, in which enthusiastic use of the interactive services was reported, was when it had been prompted by the red-button ‘Call to action’, especially during sporting broadcasts. In some cases such a discovery led to more general exploration of the red-button. But in at least one case the viewer inferred that interactive services were ONLY available when this call to

action was visible. This seems like a plausible inference, and signals an interesting design-trap of the call-to-action – or at least a design tradeoff.

J:” I use interactive, I find that brilliant for snooker. ...It came up, press the red button for you know further matches so a bit warily I pressed the red button and it came up.”

K: “No – could I press it anytime and something would come up?!”

Because this call-to-action is not visible on some programmes, the availability of the red-button as a resource is affected by a viewer’s non-interactive TV preferences.

Social support for exploration

Exploration and take-up of interactive services by one family member can encourage their exploration by another. Because J discovered the interactive extensions of snooker broadcasting, his wife discovered interactive extensions to the Chelsea Flower show.

Interactive TV as TV versus home computing

Many of our cases of regular and enjoyed use of interactive TV concern the extensions to concurrent programs – e.g. alternatives during sports events, during flower shows.

These can be contrasted with the free-floating information services such as the weather and news services. In these cases there are at least three competing services that seem to influence attitudes and take-up. First, there are the prior teletext services, with which some of our interview sample had previous experience. Second, some news and weather is available on non-interactive 24-hour news channels. Third, quite a few of our respondents report using the web on a home computer for information services.

When our respondents mentioned teletext, it was to suggest it as a causal precursor to the use of interactive information services.

24 hour news channels were quite popular and surely must rationally reduce the attraction of iTV information. Similarly with WWW – several respondents wondered out loud about the usefulness of iTV information, given the more rapid access to similar information on the Web.

The negative associations of TV and the rationing of viewing time

Although in retrospect it may seem unsurprising, we discovered a theme in our interviews which (especially in combination with the above theme concerning the nearest technological ‘neighbours’ of interactive services) forced us to adjust our perspective concerning how customers choose to allocate time to digital services – and to information and entertainment in their environment more generally.

Many respondents alluded to a notion of a TV-watching time budget. Sometimes this was done in the context of evoking explicit negative images concerning over-consumption of TV:

J: “I don’t think you should watch television all through the day. I mean there might come a time when we’re not active enough...but I don’t want to now, we just don’t switch it on....I don’t want to be governed by television.”

L: “If we always had something worthwhile to do we probably wouldn’t watch it at all.”

ID: “I think it’s a slippery slope when you start watching TV during daytime.”

These and other responses suggest that for reasons of self-image or self-actualisation, many of our respondents do not wish to spend more time watching TV. This in itself is a substantial barrier to the take-up of interactive services – to the extent that these services are classified as TV-watching.

We suggest that time-allocation decisions are sometimes made in two stages – first a *type* of activity is chosen and only then is a particular selection made from within that type. This means that one TV programme may directly compete with another, but only indirectly compete with an alternative activity like going out for a meal. Also, it means that interactive services are competing for a part of the time-budget that some customers find all too easy to fill – they are rather trying to resist spending more time in front of their TV. To encourage further exploration of digital information services it may be, ironically, be necessary to somehow decouple them emotionally from ordinary programming – exactly counter to the main examples of successful use of current services that we found (e.g. additional sports choices, as noted above).

Experimental Work

New Background

A major impact on our planned experimentation was the publication, in December 2007 (i.e., after our project began, and only discovered by us a month or so later) of a paper reporting experiments very similar indeed to those we had proposed, and on a scale beyond our resources.

Novak & Maher (2007) investigated exactly the hypothesis we broached in the proposal – that older compared with younger adults should choose less varying sequences of consumption episodes. They even modeled their experiments on the variety-seeking paradigms in the decision-making literature that we had reviewed in our proposal and intended as a model for our own – asking participants to plan and later ‘consume’ sequences of songs from a juke box (in addition, they report an experiment using flavoured jelly beans).

Because of the large overlap between this new work and that we proposed, it is worth noting their method and findings, before explaining how this unexpected

event allowed us to realign our own investigations more closely with the specifics of TV and digital interactive services.

Novak & Maher (2007) reasoned, as we had done in our proposal, that older participants may show lower preference for variety when choosing sequences of items for later consumption. One reason for proposing such an effect is that older adults have been shown to be less drawn to acquiring new information, and more prone to be risk-averse in managing their emotional state – each of these biases might suggest choosing an option that one knows one will like, rather than seeking variety for the sake of variety.

The operationalisation of ‘variety’ in Novak & Maher’s studies, as in those we reviewed in our proposal (e.g. Ratner et al, 1999) was number of repetitions in a sequence. For example, participants were invited to eat 12 jelly beans of 9 flavours or chose 12 ‘listens’ from a list of 9 songs. The number of repeated flavours or songs (minimum 3, maximum 11) is an index of inverse variety.

One interesting additional variable in Novak & Maher’s studies is whether participants chose a sequence in real time (eating or listening to one item at a time), or rather planned a sequence for later consumption. One can argue that risk aversion will be more salient when planning for later consumption. In support of all these hypotheses, Novak & Maher reported that older adults, unlike younger adults, chose less various sequences when planning future consumption.

In one experiment Novak & Maher also measured actual experienced enjoyment. They reported that both younger and older adults enjoyed their future experiences more than they predicted that they would.

It was, of course, unnerving to come across a published report so overlapping with our proposed research. If our original plan remained intact we would now be reporting similar effects in similar experiments to those reported above (although, to be honest, the financial and time constraints of our programme

would not have allowed such powerful studies). On the other hand, it is pleasing to have our orienting hypotheses confirmed, especially as, in the context of our applied questions concerning TV watching the findings open up as many conceptual and empirical questions as they close. In particular, it is clear that TV consumption episodes (including interactive services) are quite different to songs (and jellybeans!) in a number of ways that seem particularly salient in connection with operationalisation of variety-seeking.

Unlike songs, exact repetition of tokens is relatively rare in TV watching (although fans of Friends may disagree). Repetition of types is of course commonplace, and is the basis of the most popular TV. This argument applies equally to information services (news, weather and football scores, etc.) and to other interactive services like quizzes.

Consequently, token-repetition within a sequence does not seem an appropriate operationalisation for variety seeking in our domain. Furthermore, meaningful TV experiences are considerably longer lasting than the three-minute song – creating large pragmatic difficulties in simply transferring the experimental paradigm to our domain.

In light of these considerations we designed experiments of two distinct kinds. The first – single choices among described types of viewing experience – was inspired by earlier work on the motivational effects of ageing that offer a plausible theoretical underpinning for the variety-seeking phenomena we are interested in. (The second utilised current BBC research on design of EPGs and will be motivated and described later.)

Fung, Carstensen and Lutz (1999) gave older and younger participants simple choices concerning which social partner among three they would choose to spend half an hour of free-time with - an 'immediate family member', 'a recent acquaintance with whom you have much in common' or 'the author of a book you have just read'. As predicted, older participants were more likely to choose the emotional low-risk family member.

One explanation for this kind of motivational shift in age is that older people become more aware of their limited lifespan, and therefore have less to potentially gain from new pleasures. In keeping with this explanation, if participants were asked to imagine a context in which time was limited independently of age – e.g. an imminent migration – the differences between age cohorts was reduced or removed.

Experiments of this kind provide a suitable model, it seems to us, for exploring the effects of ageing on TV-watching preferences, including interactive services, so as to explore ‘variety seeking’ and its motivational basis without needing to involve participants in protracted periods of actual TV consumption.

Single-Choice Experiments

We performed two experiments of this kind. Our findings were interesting (and statistically reliable), but far from simple, and in some ways contrary to our hypotheses. They do show age effects on preferences, and confirm that these are in part due to an orientation to some concept of ‘time remaining’.

What alternative TV-watching experiences might be offered, so as to explore the issue of variety seeking and its relation to emotional risk-taking? For the first experiment, we chose three choices that might all be considered attractive, but which seem intuitively ranked according to tradeoff between degree of certainty and potential for gain (in direct analogy with the social partners manipulation of Fung et al, 1999).

The method for both experiments was identical, the only difference being one of the three alternatives from which participants had to choose. In each experiment participants were asked to make two choices in a fixed order, each choice from a set of three TV-watching experiences.

Experiment 1

Method

The first choice was presented as follows:

“Imagine that you have half an hour of free time with no pressing commitments. You have decided that you will spend this time watching a television programme. The following three programmes are available to you, which would you choose to watch?

1. A repeat of a favourite episode of a favourite TV series.
2. A new episode of a TV series that you usually enjoy.
3. An episode of a new TV series that you’ve never seen but which stars several of your favourite actors.”

The three numbered alternatives, shown above in one order, appeared in a randomized order, and the participant had to indicate his or her preference by entering the number on the interactive form.

Once this first decision was completed, the participant was presented with a second choice, introduced as follows:

“Imagine that you are due to emigrate in less than a week. Once you have emigrated, you will no longer be able to receive English television channels. You have everything organised and have half an hour of free time with no pressing commitments, you have decided that you will spend this time watching a television programme. The following three programmes are available to you, which would you choose to watch?”

The same three alternatives were then presented and the participant indicated their preference in this revised context.

The experiment was presented on-line using Survey Monkey.

Participants

Participants for Experiment 1 were recruited through an advertisement at the University of Manchester research participant volunteer website. In Experiment 1 there were 93 participants, of whom 41 were 'older' (mean age 64.36, range, 60-81) and 52 were 'younger' (with a mean age of 28, range 18-57).

Results

Figure 1.1 shows the percentages of older and younger participants who made each choice in each of the two conditions of the experiment.

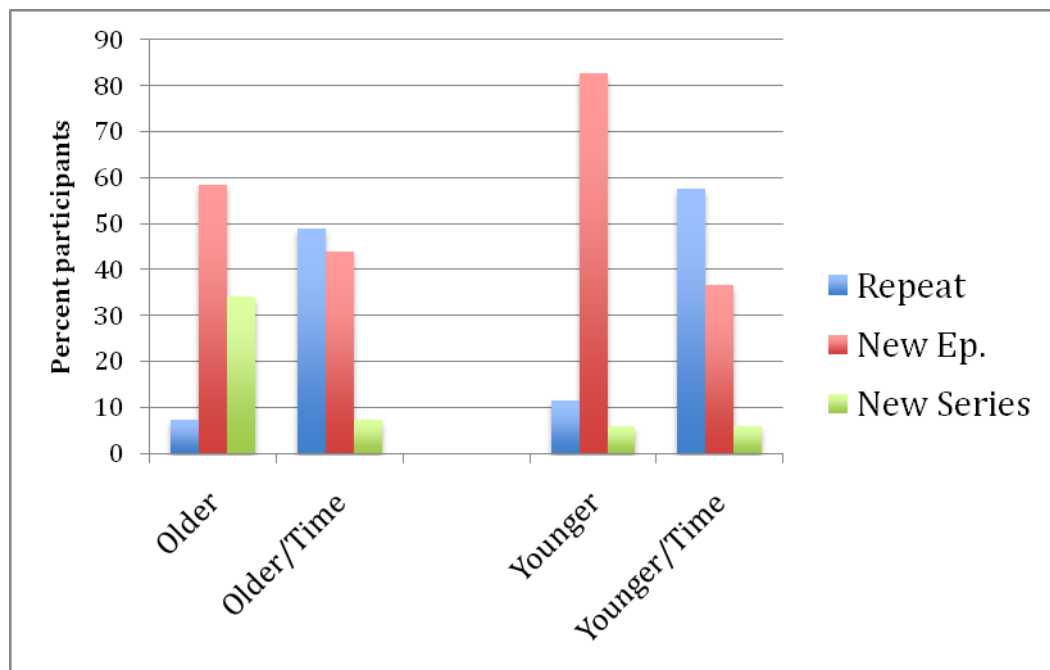


Figure 1. Experiment 1. The percentage of older and younger participants choosing each of three types of programme to watch, in an ordinary context or an imagined time-limited context (imminent emigration).

Statistical analyses, using the chi-squared test were performed on the raw frequency data (percentages are used in Figure 1.1 for easier eyeball comparison, considering that there were fewer older than younger participants). The chi-squared tests supported the idea that older and younger participants' choices would differ in the neutral context, χ^2 (N=93) = 12.38, $p < .005$, and that this difference would not be apparent in the time-limited context, χ^2 (N=93) = 0.74, $p = 0.69$. However, contrary to predictions, older participants' choices, as well as younger participants' choices were affected by the imagined time-limited context (for example a McNemar test on the proportion of Repeat choices in the two choice contexts – neutral v. time-limited – is significant for both older and younger groups)

In both the older and the younger groups, the effect of the time-horizon of imminent emigration is to shift some of the preferences away from the New episode toward the Repeat episode. In the older group there is also a shift from the New Series to the Repeat episode. The most striking difference between the two age groups is in the first neutral-context choice: more of the older participants choose the New Series.

Experiment 2

Experiment 2 was a replication of Experiment 1, except that one of the three alternatives was changed. In place of the Repeat of a favourite episode, the new alternative was:

“Browse interactive information (including interviews, documentary materials out-takes etc.) about a favourite series.”

Participants

Participants were recruited as before, with care taken to exclude those who had completed the first study. There were 41 older participants (mean age 67.9, range 60-83) and 97 younger participants (mean age 21.71, range 18-57).

Results

The percentage of participants in the 4 conditions of the experiment who chose each of the three alternatives is shown in Figure 2. In comparison with Experiment 1, we can see that the Interactive option is less popular than the Repeat, especially in the time-limited context.

Again, the frequency data were analysed using the Chi-squared test, where appropriate. Again, Older and Younger participants' choices varied significantly in the first choice, χ^2 (N=138) = 7.78, $p < 0.05$, but this time they also varied for the time-limited context choice χ^2 (N=138) = 6.60, $p < 0.02$.

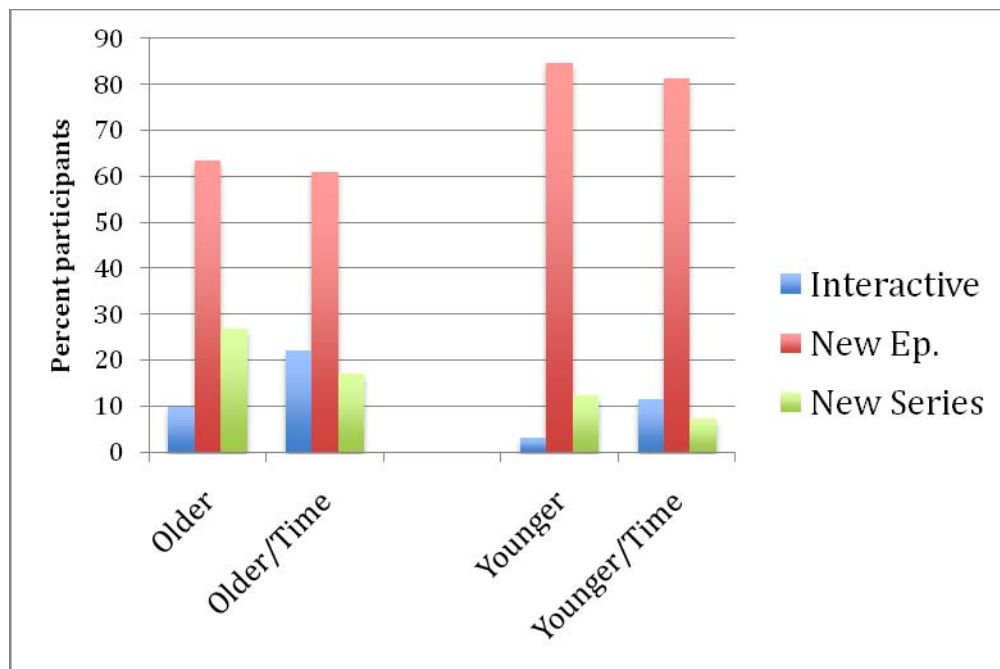


Figure 2. Experiment 2. The percentage of older and younger participants choosing each of three types of programme to watch, in an ordinary context or an imagined time-limited context (imminent emigration).

McNemar tests on the proportion of Interactive choices showed no significant effect of choice context on the Older group, but a significant effect (increase of Interactive choices, $p < 0.05$) on the Younger group. In this sense, the time limit context makes the Younger group more like the Older group, as predicted (although it does not eliminate the difference).

Surprisingly, again, the older participants showed a greater relative preference for the New Series and for the Interactive service.

Discussion

In one sense the pattern of responses in both experiments is as expected, in that the imagined time-constraint of the second choice brings the Older and Younger participants' preferences closer together. In the first experiment this is complicated by the fact that both groups were affected by this imagined context, contrary to predictions.

Thus, there is evidence for difference in preferences due to ageing, and for part of the explanation for these differences being a focus on some sense of 'time remaining'.

But much more surprising is the nature of the age differences. In both experiments they go very much against what might be expected from the simplest extension of the idea of increasing emotional focus and risk aversion with age. We will return to this perplexing pattern in our data in the final section of this report.

Experiment 3: Scheduling using an EPG

Introduction

If older adults' attenuated variety-seeking does not show up in the particular choices used in Experiments 1 and 2, should we conclude that it is not

operational in the realm of TV viewing? Such a conclusion seems premature for a variety of reasons, not least because Experiments 1 and 2 presented choices that did not mirror, in terms of information presentation, the choices that are actually active during TV consumption. TV viewers do not typically settle down to watch abstract programme types, but rather more specific types – particular programmes, as described in printed schedules or EPGs, or as sampled briefly during channel surfing.

We were particularly interested in the use of EPGs – in part because they are an active design issue at the BBC, and in part because they have been shown to be a popular service among older viewers in our interview studies.

We hypothesized that when choices of particular programmes to watch are made from the titles and synopses available in EPGs, the motivational differences between older and younger adults may be apparent. One crucial move in this experiment is to operationalise ‘variety-seeking’ in terms of viewers’ own ratings of the familiarity of programmes. Our single-choice studies (like those in the literature) had instead used descriptions of viewing types that the experimenters judged to be variously familiar or emotionally ‘risky’.

Additionally, an experiment to test such a hypothesis would allow us some further qualitative insights into the use of near-future EPG technology.

Materials

A PC simulation of a novel EPG was developed in BBC Future Media Labs. For the purposes of the experiment a reduced window of alternatives was visible – 8 channels (including three interactive services) and their programme schedules between 19.00 and 23.00. The programme schedules and synopses were provided by BBC project partners. Half the programmes (19) were from real schedules (the ‘familiar’ programmes), half (19) were novel variants on pre-existing programmes (the ‘novel’ programmes, although, n.b. not all of these were novel in type, e.g. a 7 o’clock news programme, a new Wildlife programme).

Each programme had a name, which appeared with a reduced synopsis in the time/channel slot on the EPG.

The EPG was presented on a Dell latitude laptop with a 14-inch screen. An infrared remote control was used to navigate through the EPG. Participants used the up, down, right and left arrow keys to navigate through the EPG. A programme is highlighted on the EPG, pressing the arrow keys moved the highlight around the EPG by one programme or one channel at a time. A brief synopsis of the currently highlighted programme appeared in the bottom left hand corner of the display. If participants wanted more information they pressed the ok button in the centre of the arrow keys, in which case a new screen containing full synopsis was displayed. To return from this screen onto the full EPG screen required a press of a blue button as instructed on the screen.

Figures 3.1 to 3.3 show screen shots from the EPG to further illustrate its contents and modus operandi.



Figure 3.1 EPG Screen showing the 'lower' 8 of 9 channels and the 19.00 programme on Five highlighted.



Figure 3.2. EPG Screen after a highlighted programme has been selected.

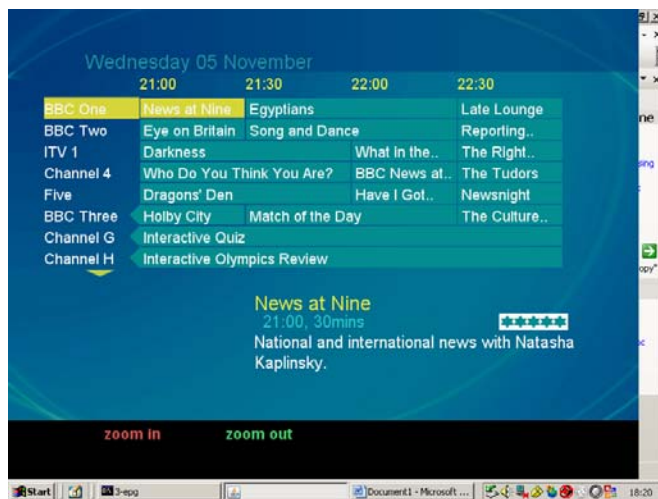


Figure 3.3. EPG Screen scrolled up to top channel and to later time-slots

Participants

Participants were recruited as before. Ten older participants (mean age 69.5, range 60-83) and ten younger participants (mean age 23.2, range 19-25) took part in the experiment.

Procedure

The experiment was run in participants' homes (older participants) or in a university laboratory (younger participants).

Participants were informed that their task was to browse TV listings so as to schedule an evening's viewing. They were shown the EPG and the remote control, and the navigation controls were demonstrated. Participants were allowed to ask questions of the experimenter until they declared themselves ready to begin.

Participants were presented with a time-marked response sheet on which to mark their choices, and allowed as long as they wished to complete the task.

Once the scheduling task was complete, participants were asked a series of questions design to tap the process they had used, any difficulties they had encountered with the EPG, and their attitude toward the three interactive services.

Finally, participants were given the entire list of programmes and asked to declare whether they had heard of them, watched them, and to rate the familiarity of each on a five-point scale.

Results

In populating the EPG with content, we chose to add 'novel' (although realistic) programmes, to try to ensure some variation in the familiarity of the programmes. A simple manipulation check confirms that this was successful, the mean ratings of 'novel' and 'familiar' programmes by older and younger participants respectively are shown in Table 1.

	Familiar Progs	Novel Progs
Older participants	3.36	1.88
Younger participants	2.71	1.46

Table 1. EPG Experiment: mean familiarity ratings of older and younger participants for the two types of programme. Scale from 1 (Not at all familiar) to 5 (Very familiar).

Nonetheless, it is clear that ‘novel’ programmes were not necessarily judged as entirely novel, unsurprisingly given their source in real offerings. Furthermore, it is also clear that older participants judge the programmes overall as more familiar.

This latter finding slightly complicates the analysis of participants’ chosen schedules. To test our main hypothesis, that older viewers would be more attracted by familiarity, we computed for each participant a difference score – the mean familiarity of their chosen programmes minus the mean familiarity of all programmes. Figure 3 shows the mean and standard error of this difference score in the two experimental groups.

An independent t-test confirmed a reliable effect – older participants chose programmes that were more familiar – relative to their own overall familiarity ratings – than did younger participants, $t(8) = 2.47, p < 0.05$.

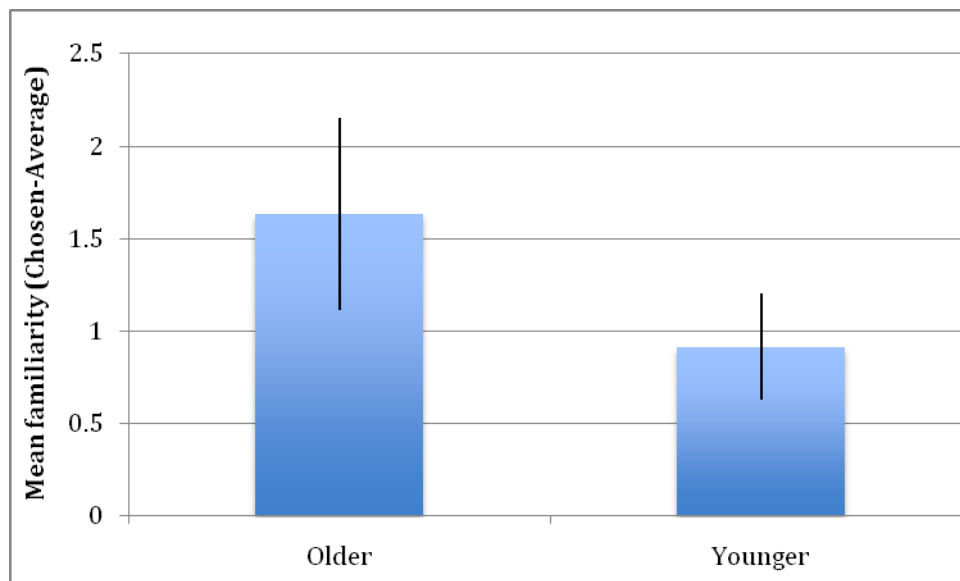


Figure 3. Experiment 3, Mean familiarity of chosen programmes (with std. errors) corrected for each participant's overall familiarity ratings.

Qualitative analysis of process

A debriefing phase was conducted to try to gain some insight into the use of the EPG and the process of completing a schedule. Additionally participants were asked directly about the Interactive services - whether they had been considered and why rejected.

None of our 20 participants reported any difficulty at all in using the EPG to plan an evening's viewing. There is apparently already a great deal of familiarity with simple scrolling and selection mechanisms for accessing information structures via a remote control, even in the older population.

Almost all participants reported searching the listings by timeslot, which fits with their scheduling task, although a couple reported searching by channel first, and a couple more mixed strategies. Several participants alluded to a satisficing strategy, in that once a good choice was found, alternatives were either not considered, or were considered less thoroughly. This kind of mechanism is

interesting in light of our comments above about Interactive TV competing for time within a general class of TV watching.

Several participants mentioned using familiarity specifically as a cue (6 older, 6 younger) although this clearly cannot explain the reliable difference in familiarity between older and younger participants' final schedules.

When quizzed about the interactive choices, several people volunteered a lack of interest in interactive TV in general: but this negative attitude was more common among the younger group (7 v 3). These numbers are small, of course, but still this tends to disconfirm our orienting hypothesis, that older viewers are less keen to explore interactive TV.

Conclusions and futures

This project was founded on a novel hypothesis – that older viewers would be less inclined to seek variety in TV consumption experiences than their younger counterparts, and that therefore this motivational effect of ageing might underpin inhibited exploration of interactive services.

Experimental work published after our project was started confirmed the general hypothesis – when variety seeking is operationalised as dispreference for repetition in planned sequences of consumption, then indeed older adults are less inclined to choose variety (Novak & Mather, 2007).

However, our own experimental work has raised considerable and interesting questions about this phenomenon, and its associated operationalisation of variety-seeking, should be translated into the TV arena.

Our experimental studies produced interesting but surprising results. We found evidence for different preferences among older viewers compared with younger

viewers, but not those we predicted. For example, when offered the following choice –

A repeat of a favourite episode of a favourite series

A new episode of a series you usually enjoy

An episode of a new unseen series starring several of your favourite actors

Older viewers were more likely to choose the third option – arguably the MOST novel – than were younger viewers. And critically, when the first of these options was replaced with

Browse interactive information (including interviews, documentary materials, outtakes etc.) about a favourite series.

Older viewers were more likely to choose this new option. We found no evidence here then of a general dispreference for novelty. Furthermore, this is very direct evidence that a basic verbal description of a typical interactive service seems at least as attractive to older viewers as to younger.

However, when older participants were asked to schedule a particular evening's viewing from titles and synopses provided on an EPG, they DID choose more familiar programmes, in general, than their younger counterparts.

We are not sure how to resolve this apparent contradiction in our findings, one important issue is presumably that the EPG experiment operationalised variety in terms of participants' own ratings of programme familiarity. The contrast with the single-choice studies highlights an important issue in how people – and older people in particular – extend judgments of familiarity across categories of experience.

The contrast between the experimental findings further certainly suggests that the context of choice – whether one is making a singular decision or planning a

sequence - may be important. It also opens important questions about how titles and synopses are judged.

Turning to the interviews, we believe that the strength of any qualitative study derives primarily from the ideas they help generate, however informally. Our interviews uncovered a range of phenomena that we find suggestive of design issues with respect to accessibility of interactive services; in these concluding remarks we will consider just two:

First, many interviewees reported use of Electronic Program Guides (EPGs), but rather limited use. For advance planning of TV-watching, paper guides were preferred, but EPG's were used in the context of channel-surfing – which is ordinarily a method of choosing immediate consumptions, as well as a consumption behaviour in its own right.

Second, successful uses of interactive services were typically directly cued or prompted – “Hit the red button now” - indeed, some respondents assumed that no services were available unless there was a prompt, others were fearful of exploring without such a direct prompt.

On the basis of these findings we propose to explore designs in which one digital service, the EPG is used as both prompt and access mechanism for other services (e.g. and especially, interactive content as elaboration and background to standard programmes, as in our experimental choice-item above). The simple suggestion is that a) EPGs should display interactive services alongside mainstream programming, as just another alternative and b) such a display should also embed some kind of access mechanism for the service.

At the same time, we propose to investigate how synopses are judged, and in particular how synopses of interactive content might be constructed so as to allow valid judgments of unfamiliar interactive services.

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