TV Channels, Self-Control and Happiness

Christine Benesch[*]   Bruno S. Frey[†]

Alois Stutzer[‡]

[*]Harvard Kennedy School and CREMA, christine_benesch@hks.harvard.edu

[†]University of Zurich and CREMA, bsfrey@iew.uzh.ch

[‡]University of Basel and CREMA, alois.stutzer@unibas.ch

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Abstract

Standard economic theory suggests that more choice is usually better. We address this claim and investigate whether people can cope with the increasing number of television programs and watch the amount of TV they find optimal for themselves or whether they are prone to over-consumption. We find that heavy TV viewers do not benefit but instead report lower life satisfaction with access to more TV channels. This finding suggests that an identifiable group of individuals experiences a self-control problem when it comes to TV viewing.

KEYWORDS: self-control, over-consumption, life satisfaction, experienced utility, TV viewing

1. Introduction

TV viewing is one of the most prevalent leisure time activities in modern societies. In many countries, the diffusion of cable or satellite televisions has led to a large increase in the number of TV channels and programs available to consumers. The evaluation of this development is unambiguous within a traditional economic framework. More choice raises individual welfare as - by assumption - people are able to rationally maximize utility. In this paper, we challenge this view and hypothesize that people with severe self-control problems suffer a utility loss when they are exposed to a larger set of choices. Specifically, the positive effect from a potentially better match between TV programs and individual preferences is more than offset by the loss of well-being resulting from over-consumption.

The expansion and diversification of TV accessibility over the last few decades has, in many countries, gone hand in hand with increased TV viewing time (see the collected studies in Becker and Schoenbach 1989). Revealed preference therefore suggests that, for many people, TV consumption is a significant source of well-being. This assessment stands in contrast to the mixed appraisal of TV viewing in society. Television has been called a 'plug-in-drug', keeping people glued to the screen and impeding the enjoyment of more valuable activities. Accordingly, the increase in TV consumption over time has a negative connotation and is associated with a decline in social capital, an increase in violence and crime, and a weakening of democracy.[1] In sum, there is a strong popular notion that people watch too much TV. People are prone to a weakness of will when faced with the temptation of TV's immediate benefits and low immediate costs. They watch more than they would like to watch, both ex ante and ex post.

This paper conducts an empirical study in analyzing the claim of systematic errors in TV consumption, based on individuals' ex post evaluations. We study whether a larger number of available TV channels (i.e., a larger choice set) raises people's subjective well-being, as standard economic theory would predict. We analyze people's self-reported subjective well-being as a new empirical approach in order to discriminate between different theories predicting similar patterns of behavior, but which are associated with different levels of individual welfare (Frey and Stutzer 2005; Gruber and Mullainathan 2005).

We test the hypothesis of limited self-control based on an interaction model and analyze how the number of TV channels affects the life satisfaction of people who watch an (unpredictably) large amount of television (referred to as heavy TV viewers) compared to individual who watch moderate levels of TV. For

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[1] For reading on the negative impacts of TV consumption on society see, e.g., Kubey (1996), Putnam (2000), Sparks and Sparks (2002) and Gentzkow (2006).

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the empirical analysis, we use recent data from the European Social Survey, World Values Survey and Television Key Facts from IP Network. Based on more than 125,000 individual observations from 76 country samples, we find a statistically significant negative interaction term between the (residual) amount of TV viewing and the number of TV channels, and calculate a negative marginal effect for the availability of additional TV channels on the well-being of people who watch a lot of TV or watch more TV than others with similar demographics. This finding is consistent with the hypothesis of limited self-control.

We discuss and empirically address three alternative explanations for the observed statistical findings. First, we take into account the fact that the measure for the number of TV channels might not be representative for heavy TV viewers and the fact that the degree representativeness might vary systematically across countries. Second, the average negative marginal effect might also reflect some negative net effect from increased market competition that benefits some people while penalizing others, irrespective of heavy TV viewers suffering a self-control problem. In particular, competition between channels might benefit consumers who are valued by advertisers; i.e., young adult viewers and female viewers. Third, the results could be due to a selection effect in the sense that dissatisfied people turn to TV viewing in order to remedy their unhappiness. The more available TV channels there are, the more alluring TV viewing will be to such individuals as an attractive alternative (to drinking, for example).

In our extended analysis, we do not find evidence for the first two alternative hypotheses. First, the negative marginal effect of additional TV channels is robust in a sample adjusted to the differences in diffusion of terrestrial, cable and satellite TV across countries and over time. Second, heavy TV viewers among young adults and women do not experience an increase in the level of well-being, but there is a decrease similar to that found in the full sample. The third alternative explanation cannot be ruled out in our ex post facto design. Instead, we propose a refined interaction analysis and study the effect of additional TV channels separately for people assumed to have more and for those assumed to have fewer resources for self-regulation.

This study has links with three strands of economic literature. First, it contributes to the recent research on media consumption and its consequences (see, e.g., Prat and Strömberg 2005; Bruni and Stanca 2006; Gentzkow 2006; Bruni and Stanca 2008; Gentzkow and Shapiro 2008; Benesch 2009). Second, it adds to the evolving literature on individual welfare, based on data on subjective well-being (for surveys, see Frey and Stutzer 2002; Layard 2005; Stutzer and Frey 2010). Third, it offers a complementary approach to studying time inconsistency in consumption choice (for a survey, see Frederick et al. 2002).

Section 2 outlines the idea of systematic errors in consumption due to time-inconsistent preferences in a framework of decision utility and experienced utility. The testing strategy is derived from simple graphical analysis. Section 3 presents the data and the results of the empirical application. Section 4 offers concluding remarks.

2. Experienced Utility in a Model of Time-Inconsistent Preferences

Standard economics assumes that people have no self-control problems, and that they are able to make decisions based on their long-term preferences. The consumption of goods and the pursuit of activities that are generally considered to be forms of addiction, or at best bad habits, such as smoking cigarettes, watching large amounts of TV, or constantly eating fast food, are regarded as rational acts under the assumptions of economics. Contrary to this view, many people judge their own and other people's consumption behavior as irrational, in the sense that they believe they would be better off if they consumed less of these goods. Goods offering immediate benefits at negligible immediate marginal costs are generally tempting. The psychological literature offers a large body of evidence on limited self-control (for an overview, see, e.g., Baumeister and Heatherton 1996).

Based on the theory of revealed preference, it is difficult to discriminate between the view of consumers as being rational agents and consumers facing self-control problems.[2] If temptation interferes with people's decision making, there might well be a discrepancy between what individuals do and what they like. Using the terminology introduced by Kahneman et al. (1997), there might be a gap between decision utility and experienced utility. The distinction between decision utility and experienced utility leads to the idea that ex post evaluations can be a valuable source of information on bounded rationality in people's decision-making. How do people fare after they have made decisions?[3]

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[2] We are aware that there are specific situations in which the standard economic model rules out certain types of behavior and the mere observation of a certain action leads to a rejection of the standard economic model. There are some studies that successfully pursue this approach. Two important examples, which document the kind of behavior where the standard model does not apply, are DellaVigna and Malmendier (2006), who examine gym attendance under different contracts, and Skiba and Tobacman (2008), who show that certain types of payday loans would always be rejected by time-consistent individuals.

[3] Our analysis of ex post evaluations of consumption decisions can be linked to the concept of 'regret' as the term is generally understood in everyday usage. Regret is a self-reflective emotional dissatisfaction with how a person has acted in the past. Emotions such as sadness, shame, embarrassment, depression or guilt reduce the level of utility experience after pursuing some consumption activities (as the individual subsequently regrets having pursued them). This interpretation is different from the concept of 'regret' in economic decision theory (see, e.g., Loomes and Sugden 1982), where the behavior of rational people (without any appraisal conflicts in implementing their preferred consumption plan) is predicted.

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This poses the question of how to ascertain a (normative) standard, and whether seemingly irrational behavior should be judged welfare-reducing because it violates certain time-consistency criteria. While there is an extended debate on this issue (see, e.g., Bernheim and Rangel 2005), we use people's personal evaluations to establish the standard. We operationalize this standard in terms of individuals' judgments of their overall subjective well-being, rather than how they evaluate options when faced with a particular decision.

We outline the basic idea in a graphical analysis of a simple two-period model and extend it to illustrate our empirical testing strategy. We draft the case in which an extended opportunity set, here the number of available TV channels, decreases the experienced utility of consumers with a severe self-control problem.[4]

An individual decides on the consumption of x, here the amount of time devoted to TV viewing, based on the enjoyment of x (i.e., utility u(x) in period 1) and the future costs c(x) in period 2, discounted by a factor δ. This reflects that benefits are experienced instantaneously, with zero immediate costs. In order to watch TV, one simply has to push a button. In contrast to going to the cinema, the theater or any outdoor activity, there is no need to dress appropriately before leaving the house, and there is no need to buy a ticket or to reserve a seat in advance. Unlike many other leisure activities, TV viewing does not need to be coordinated with other people. As a consequence, compared to other leisure activities, watching TV has an exceedingly low or nonexistent entry barrier. The costs resulting from TV consumption are largely experienced in the future. The negative effects of not getting enough sleep, for example, only arise the next day, and the consequences of underinvestment in social contact, education or career interests take much longer to become manifest.[5] Given these circumstances, where TV viewing offers instant benefits at negligible immediate marginal cost, time inconsistency may arise. At the outset, a consumer (i.e., in period 0) plans to spend x^* minutes watching TV, equalizing marginal benefits and marginal future costs (i.e., u'(x)=δ*c'(x) represents the first-order condition). However, when faced with making an actual decision on TV consumption, given the temptation of immediate gratification, future costs are only partially considered (here by a factor $\beta \in (0,1)$), and the consumption plan is revised so as to equalize u'(x)=β*δ*c'(x).

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[4] Our analysis is related to the one by O'Donoghue and Rabin (2001), who show in a theoretical model that more choice among tasks with immediate costs and future benefits can lead to severe procrastination, and that a person might procrastinate more when pursuing important goals rather than unimportant ones. Our analysis is much simpler and emphasizes the case in which a more attractive alternative with immediate benefits and future costs might lead to amplified myopic behavior.

[5] The effect that television has in inflating people's material aspirations by over-promoting wealth, fame and beauty cannot necessarily be predicted at all.

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This formulation follows models of (quasi-)hyperbolic discounting (see, e.g., Laibson 1997). People who lack the self-control to maintain their original plans end up consuming x^c (i.e., more than they consider optimal for themselves in the long-run) and experience an individual welfare loss.

Figure 1 illustrates this situation for a specific set of preferences. It shows x^*, the planned consumption level, and x^c, the actual consumption level chosen due to the self-control problem (i.e., $0 \leq \beta < 1$). The triangle ABC indicates the individual welfare loss due to over-consumption. Total experienced utility over the two periods is lower than it would be if x^* were consumed.

Figure 1: The Loss of Experienced Utility with Time Inconsistent Preferences
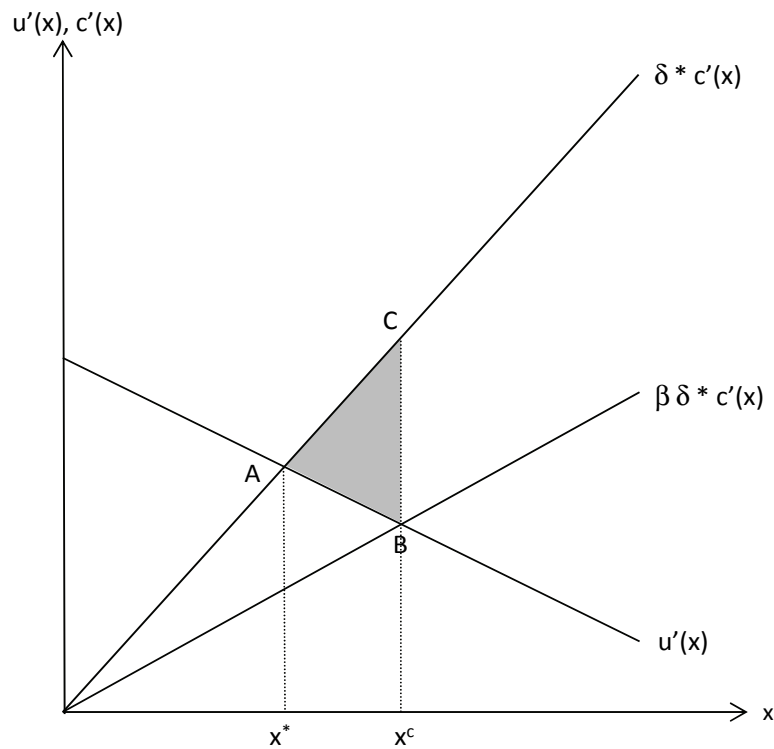
Based on people's reported judgment of their overall satisfaction with life, it would, in principle, be possible to directly capture the welfare loss: For otherwise similar individuals, the subjective well-being of heavy TV viewers could be compared with the subjective well-being of moderate viewers, and the difference attributed to systematic errors in consumption due to a lack of willpower. However, this approach is not feasible empirically. An omitted variable bias could occur because unobserved individual differences, such as being an introvert, might well be related to lower subjective well-being and higher

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TV consumption, regardless of any self-control problem. Reverse causation is possible: Unhappy people might spend more time watching TV. Finally, preference heterogeneity with regard to TV viewing might be directly related to people's reports of subjective well-being.

We argue that these empirical challenges can be overcome in a refined approach studying the expansion of the opportunity set. In the case of television, this is the ongoing increase in the number of available TV channels.

Figure 2 offers a graphical analysis that illustrates this idea. The expansion of the choice set is represented by an increase in the marginal utility of TV consumption from $u_1'(x)$ to $u_2'(x)$. An individual with time-consistent preferences increases TV consumption from x_1^* to x_2^*, and experienced utility is increased by the area ADG. For an individual with time-inconsistent preferences, there are two effects on experienced utility resulting from the shift in marginal utility. First, the shift increases experienced utility from the initial amount of TV viewing, because it is assumed that more channels mean more variety and better preference satisfaction. In other words, consumer surplus is increased, reflected by the area BHG.[6] Second, the increased attractiveness of TV viewing leads to a revision of consumption plans. At this stage, an expansion of the opportunity set might reduce overall experienced utility. Because people with a self-control problem undervalue future costs when faced with a decision between turning their TVs on or off, they increase consumption more than would be optimal.[7] Again, they realize a level of experienced utility that is below what they would experience if they were able to choose TV consumption optimally. The reduction in experienced utility due to a further increase in consumption amounts to the area CHEF. Whether more alternatives make people with a self-control problem worse off overall depends on the relative size of the two effects on people's experienced utility. If the two effects are studied theoretically, they depend, of course, on the assumed functional form for the marginal utility and marginal cost of TV viewing. With linear functions, the net effect is more likely to be negative the larger the factor β is, and the less marginal utility $u'(x)$ is decreasing (i.e., the closer $u''(x)$ is

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[6] Area BHG consists of two parts: ADG is the increase in actual consumer surplus, and ABHD is part of the former welfare loss that is now offset.

[7] A study on the introduction of cable TV in Israel (comparing neighborhoods with a difference-in-difference approach) supports this view (Weimann 1996). With cable TV, there is a significant increase in the percentage of viewers agreeing to the statements "I often watch more television than I intend to" (28% before the introduction of cable and 41% one year later) and "watching television is often a waste of time" (24% before the introduction of cable and 36% one year later). Asking people directly whether they think that they watch too much TV could, of course, lead to answers that are motivated by social desirability. It should be noted that surveys on general life satisfaction (as used in our study) are plausibly not affected by such a bias that is systematically correlated with some specific consumption behavior.

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to zero). In Figure 2, for the particular combination of marginal utility, marginal costs and β, CHEF is larger than BHG.

Figure 2: Gains and Losses in Experienced Utility Due to a More Attractive Technology
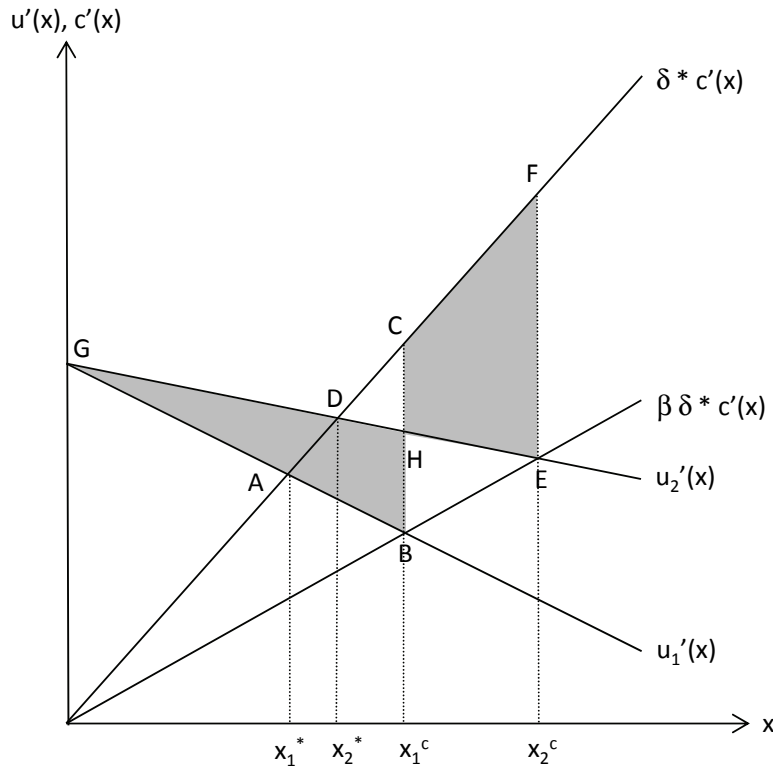
In the next section, our empirical analysis uses the possibility of a negative net effect as a testing strategy to identify self-control problems in TV consumption. It is hypothesized that the experienced utility of people with a severe self-control problem in TV viewing is reduced when they have access to a larger number of TV channels. We are aware that this is a conservative test and that the threshold is set high to reject the rationality hypothesis. Even if nobody loses from an increased opportunity set, there might still be over-consumption. However, the over-consumption cannot be detected, either by revealed behavior or by studying reported subjective well-being.

3. Empirical Analysis

3.1 Empirical Testing Strategy

Our basic hypothesis proposes that a larger number of TV channels, while possibly beneficial for rational consumers, reduces the welfare of consumers with self-control problems. In our test, we use reported life satisfaction as an approximation to individual welfare. We propose the consumption of large amounts of TV as an indicator for people who cannot completely control their TV consumption and refer to these individuals as 'heavy TV viewers'. Accordingly, the interaction term between the number of available TV channels and the indicator of self-control is our main variable for the hypothesis test.

The alternative hypothesis states that heavy viewers simply have an increased preference for TV consumption or that they have no higher-return activity available to them. In both of the latter cases, the standard model assumes that these people optimally allocate their time and additional TV channels raise their utility level, as this increases the probability that a program will match their preferences. At best, the additional channels should not reduce their utility level, because they could simply ignore these channels.

In order to test the basic hypothesis, we specify two types of microeconometric life satisfaction functions. In the first type, the life satisfaction LS_i of individual i depends on his or her television consumption TV_i, (as an indicator of a possible self-control problem regarding TV consumption); on the interaction between this indicator and the number of TV channels N_j available in country j in a given year;[8] on personal characteristics X_i; as well as on country specific effects D_j:

$$LS_i = \beta_0 + \beta_1\, TV_i + \beta_2\, (TV_i * log(N_j)) + \gamma_1\, X_i + \gamma_2\, D_j + \varepsilon_i \qquad (1)$$

In order to calculate the marginal effect according to the level of TV viewing, we specify a second extended life satisfaction function. In addition to the variables in Equation (1), the regression includes the number of TV channels available in a country. As this information is at country level, we can no longer control for country-specific fixed effects. Instead, we add the control variables Gross National Income (adjusted for comparative price levels) in its logarithmic form $log(GNI_j)$, as well as average TV viewing time $AvgTVj$ in a country.[9] This leaves us with the following second specification:

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[8] In our setting a country-level variable for the number of TV channels is preferable to a variable that captures them at an individual level. The latter variable would reflect individuals' choices (and thus the number of channels would be driven partly by individuals' preferences). In contrast, we are interested in an overall restriction of the degree to which TV viewers are tempted.

[9] Data for Gross National Income are from World Development Indicators (several years), and

$$LS_i = \beta_0 + \beta_1\, TV_i + \beta_2\, log(N_j) + \beta_3\, (TV_i * log(N_j)) + \gamma_1\, X_i$$
$$+\ \gamma_2\, log(GNI_j) + \gamma_3\, AvgTV_j + \varepsilon_i \qquad\qquad (2)$$

Substantial TV consumption (as an indicator of a potential self-control problem) enters the analysis in two ways. First, we include the level of TV consumption,[10] whereby consumers who "ceteris paribus" spend a lot of time watching TV are identified by simultaneously including personal characteristics X_i in the estimation equation. Second, we calculate a residual measure of TV consumption at the country level, because the simple amount of TV consumption might be a noisy measure of a possible self-control problem. There are many reasons why some people watch more TV than others independent of self-control. For example, people with a large amount of free time, such as retired and unemployed persons, or people with lower education and income, spend more time than average on TV consumption. We therefore propose the residuals of first-step regressions that explain individual TV consumption by respondents' socio-demographic characteristics for each country sample separately as a refined measure for heavy TV consumption.[11] In order to make the residuals comparable across countries, they are converted into deciles for each country. Hence, we expect people in the upper deciles, who watch more TV compared to similar people, to suffer from a self-control problem. There is, however, a trade-off with the first approach in the sense that factors that are potentially correlated with limited resources of self-control are partialled out. Accordingly, we check the robustness of our results using country deciles of residual TV viewing, calculated from a regression that only includes sex and age as explanatory variables.

Our empirical testing strategy differs substantially from previous research in behavioral economics. This research generally studies whether the explanatory power of an (empirical) model is augmented when the variation in people's levels of self-control are taken into account. Empirically, limited self-control is captured, for example, by using behavioral markers, such as 'not possessing a bank account' or 'having had numerous hangovers from alcohol consumption in the recent past' (see, e.g., DellaVigna and Paserman 2005), by letting people in experiments choose between immediate payoffs and higher delayed payoffs (Thaler 1981), or by self-reported indicators (e.g., Tangney et al.

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data for average TV viewing time are from IP Network (several years).

[10] Individual TV consumption is mean-adjusted at the country level.

[11] The explanatory variables are household income, age, sex, nationality (i.e., whether born in the country of residence or not), employment status, education, marital status, type or size of place of living and, additionally for the ESS, household size and working hours. For a description of the data, see section 3.2. Between 3% and 32% of the variation in TV viewing time is explained by these individual characteristics. Residual TV viewing time ranges from -3.41 to 3.21 hours.

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2004). However, psychological theories emphasize the idea that self-control is not a personality trait but a resource (i.e., there is a limited capacity for self-regulation). Resisting one temptation may result in poorer regulation of a concurrent desire for immediate gratification, or vice versa (Muraven et al. 1998). Accordingly, markers of self-control problems in one domain (e.g., smoking or drinking) need not concur with over-consumption in a different domain. Hence, self-control problems need to be studied for specific domains. Moreover, the mentioned approaches do not directly analyze the welfare consequences of supposedly shortsighted behavior, but rather assume or derive them from some imposed objective utility function. Often, the preferred consumption plan of the 'planning self' is taken as a reference standard. We therefore depart from the previous literature in economics and, first, directly estimate welfare consequences and, second, study self-control problems within a single domain.

3.2 Data

The empirical analysis is based on data from the first two waves of the European Social Survey (ESS) and the third and forth waves of the World Value Survey (WVS), and supplemented by data on the number of TV channels at a country level collected by IP Network.[12] Data from the ESS is for 21 European countries for 2002 to 2003[13] and for 25 European countries from 2004 to 2006.[14] With the WVS, data on the number of TV channels is available for 28 countries from 1995 to 1997[15] and for 2 countries for 2000 to 2001.[16] Countries common to more than one survey or wave are treated as separate entities, as they are observed in different years. We, thus, have no time dimension in our analysis, but apply a cross-section framework. In each country, between approximately 600 and 3,000

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[12] For the ESS data, see Jowell et al. (2003; 2005). The data are archived by the Norwegian Social Science Data Services (NSD). For the WVS data, see European Values Study Group and World Values Survey Association (2006); for the IP Network data, see IP Network (several years).

[13] The countries included are Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, The Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

[14] The countries are Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the Ukraine, and the UK.

[15] The countries included are Belarus, Brazil, Bulgaria, Croatia, the Czech Republic, Estonia, Finland, Germany, Hungary, India, Japan, Latvia, Lithuania, Macedonia, Mexico, Norway, Poland, Romania, Russia, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, the Ukraine, USA and Venezuela.

[16] The two countries are South Africa and Spain.

individuals were interviewed, supplying us with a total sample of 127,949 observations.[17]

The three key variables in our analysis are TV consumption, reported satisfaction with life and the number of TV channels available in a country.

The ESS captures *television consumption* with the question, "On an average weekday, how much time do you spend watching television?", with answers falling into eight categories, ranging from "no time at all" to "more than 3 hours". In the WVS, the question is "How much time do you usually spend watching television on an average weekday?", with answers coded into four categories, ranging from "do not watch television or do not have access to TV" to "more than 3 hours". For each category, we calculate the mid-point value of the time interval. For the top category, "more than 3 hours", we chose 3.5 hours. Average TV viewing time in the sample is 2.0 hours (standard deviation 1.1). There is, however, substantial variation between countries. TV consumption is lowest in Mexico (with 1.1 hours) in wave 3 of the WVS and highest in Macedonia (with 2.7 hours) in wave 3 of the WVS.

Individual *life satisfaction* is measured by the question, "All things considered, how satisfied are you with your life as a whole nowadays / these days?" Respondents give answers on an 11-point scale ranging from 0 ("extremely dissatisfied") to 10 ("extremely satisfied") in the ESS, and on a 10-point scale ranging from 1 ("dissatisfied") to 10 ("satisfied") in the WVS. To make the two scales comparable, we combine the lowest two categories in the ESS, 0 and 1, into one category. Average life satisfaction in the sample amounts to 6.7 (standard deviation 2.4), ranging from a low of 4.0 in the Ukraine in wave 3 of the WVS to a high of 8.5 in Denmark in wave 2 of the ESS.

In addition, both surveys include a large number of socio-demographic characteristics such as income, age, gender, whether born in the country of residence or not, employment status, education and marital status. We take them into account as control variables. The variables are not coded in exactly the same way in both surveys, but similarly enough to make them comparable.

Statistical data on the number of *television channels* is available at the country level, published by IP Network in the form of the number of channels available to 70% of households. We take data that relates to the year the individuals were surveyed or the closest year available. The number of TV channels available to 70% of the population amounts, on average, to 10.3 channels (standard deviation 12.6) and ranges from 1 in India and Romania to 62 in the United States. The median is 4.5 channels (see Tables A1 and A3 in the Appendix). TV services are offered by terrestrial, cable and satellite providers. In

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[17] Of the 131,189 people originally surveyed in the countries included in the analysis, 2,336 did not answer the question regarding the amount of their TV consumption and 993 did not answer the question about their life satisfaction.

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the robustness analysis, we take into account that, due to the differences in the diffusion of these technologies, the measure for the number of channels might not be representative for the groups crucial to our empirical test.

3.3 Results

In our empirical analysis, we estimate an interaction model and test how the number of TV channels affects the life satisfaction of heavy TV viewers compared to light TV viewers. For ease of interpretation we apply an OLS estimator.[18] Because some models include estimated independent variables and variables observed at the country level, we use heteroskedasticity-robust standard errors adjusted for clustering at the country level.

Table 1 presents the basic results. Column (A) shows the direct effect of the logarithmic number of TV channels on life satisfaction; i.e., without the interaction term with TV consumption.[19] There is no statistically significant effect of the number of TV channels on life satisfaction overall. Columns (B) to (D) include the three different indicators for heavy TV consumption,[20] interaction terms with the log number of TV channels and country fixed effects according to specification (1) outlined above. In all three specifications, the interaction effect between TV viewing and the number of channels has a negative sign, is large and statistically significant at the 99%-level. Taking the different scaling of the indicators for TV consumption into account, the effects are of similar size in all three regressions (for effect sizes, see Figure 3 below). The higher a person's (residual) TV consumption is, the smaller is the marginal effect of an additional channel on his or her life satisfaction. Yet, according to this specification, we cannot assess whether more TV channels actually have a negative effect on the life satisfaction of heavy TV viewers. The marginal effect of the number of TV channels on life satisfaction could merely be smaller for heavy TV viewers than for light TV viewers, but not negative. However, it can already be said that people who watch a lot of TV or watch much more TV than predicted, based on their individual characteristics, seem to benefit the least from additional TV channels. If unpredictably high TV consumption indeed reflects personal tastes, then this result might already come as a surprise.

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[18] Given the ordinal nature of the dependent variable, we re-estimated our basic models applying ordered probit specifications. The relative size and statistical significance of coefficients are very similar to the results of the OLS estimations. The results based on ordered probit regressions are available from the authors on request.

[19] The regression is otherwise the same as for specification (2).

[20] The three indicators are hours of TV viewing, mean-adjusted in each separate country sample in column (B), deciles of residual TV viewing that are calculated from a regression only controlling for age and sex in column (C), and deciles of residual TV viewing that are calculated using all control variables in column (D).

Table 1: TV Consumption, Number of TV Channels and Life Satisfaction

Dependent variable: Life satisfaction	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Indicator of TV viewing, mean adjusted		-0.027* (-2.15)	-0.014** (-3.29)	-0.014** (-4.42)	-0.020 (-1.48)	-0.014** (-2.98)	-0.014** (-4.33)
log (number of TV channels), mean adjusted	-0.047 (-0.73)				-0.046 (-0.72)	-0.036 (-0.57)	-0.039 (-0.61)
Indicator of TV viewing * log (number of TV channels)		-0.051** (-3.47)	-0.020** (-3.88)	-0.016** (-4.06)	-0.051** (-3.42)	-0.021** (-3.86)	-0.016** (-4.04)
Individual control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	Yes	Yes	No	No	No
Control variables at country level	Yes	No	No	No	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1.824 (-0.93)	6.930** (57.01)	6.939** (57.92)	6.924** (56.44)	-1.823 (-0.93)	-1.809 (-0.93)	-1.817 (-0.93)
Observations	127,949	127,949	127,949	127,949	127,949	127,949	127, 949
R-squared	0.20	0.25	0.25	0.25	0.20	0.20	0.20

Notes: (1) OLS estimates with standard errors adjusted for clustering at country level. t-values in parentheses.
(2) ** significant at 99% level, * significant at 95% level, (*) significant at 90% level.
(3) In regressions (B) and (E) the indicator of TV viewing is hours of TV viewing, mean adjusted in each country separately. In regression (C) and (F) the indicator is deciles of residual TV viewing calculated from a regression only controlling for age and sex (5th decile=0). In regressions (D) and (G) the indicator of TV viewing is deciles of residual TV viewing calculated using all control variables as described in Section 3.1 (5th decile=0).
(4) Individual control variables include income, age, gender, whether born in the country of residence or not, employment status, education, and marital status, as well as dummy variables indicating missing observations.
(5) Control variables at country level include log GNI per capita (PPP) and average TV viewing time.
(6) For full specifications showing control variables see Table A2 in the Appendix.
Data sources: European Social Survey (Wave 1 & 2), World Value Survey (Wave 3 & 4), IP Network (several years), World Development Indicators (several years).

Columns (E) to (G) in Table 1 show the results for specification (2). The estimations now include the log number of TV channels and additional control variables at the country level, but no country fixed effects. The estimated interaction effects between (residual) TV viewing and the number of TV channels are robust for all three indicators of TV consumption and have the same size and statistical significance as in the previous specifications.

For a further interpretation of the coefficients, the mean adjustment of the number of TV channels and of residual TV viewing time must be taken into account. The coefficient of the constitutive term number of TV channels is estimated for respondents with an average level of TV consumption in their country or with an average residual (those in the 5th decile). It captures the marginal effect on life satisfaction if average TV viewers have more channels to choose from. The estimated coefficients are negative (-0.04 to -0.05), but are not statistically significant. From the latter coefficients and the interaction effects, the marginal effects of the number of TV channels on life satisfaction can now be calculated for all the different levels of (residual) TV viewing. The calculations are presented in Figure 3 together with the 90% and 95%-confidence intervals.[21] In the following, we emphasize the results of our preferred estimation (G) based on residual TV viewing calculated with a full set of controls shown in Figure 3d. The results based on the two other indicators of TV consumption are very similar though.

For people in the first decile of residual TV viewing time (i.e., those watching much less than predicted) having a higher number of TV channels to choose from has no impact on their life satisfaction. The marginal effect is close to zero. For people with above average residual TV viewing time, the marginal effect becomes negative and approaches statistical significance. Respondents viewing much more TV than predicted (10th decile) report ceteris paribus a 0.12 lower life satisfaction (t-value=1.67) when, for example, living in a country with 10 TV channels compared to living in a country with only 3 TV channels. This effect is sizeable; it corresponds, for example, to one fifth of the difference in life satisfaction between married and divorced people (-0.63).

We also estimate a more flexible specification (not shown in Table 1), allowing the marginal effect of additional TV channels to vary freely for each decile of residual TV consumption. This specification gives up the restriction that
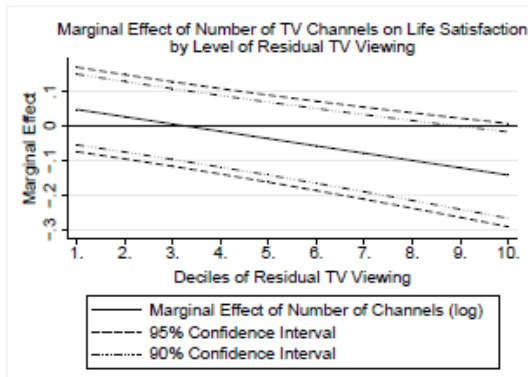
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[21] For a discussion of the interpretation and presentation of interaction models see Brambor et al. (2006).

Figure 3: Number of TV Channels and Life Satisfaction

a) Reported TV viewing time mean adjusted in each country separately
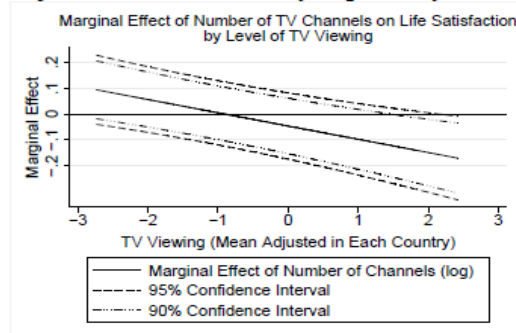
b) Residual TV viewing, calculated only controlling for age and sex, linear specification
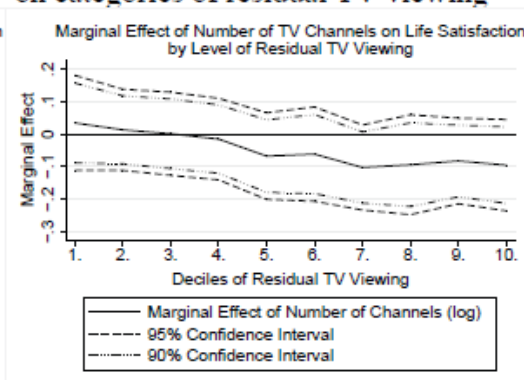

c) Residual TV viewing, calculated only controlling for age and sex, specification based on categories of residual TV viewing
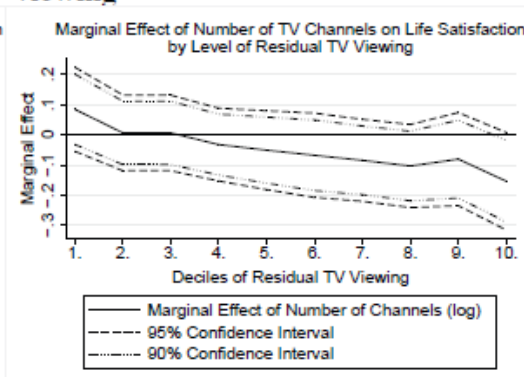
d) Residual TV viewing, calculated with full set of controls, linear specification
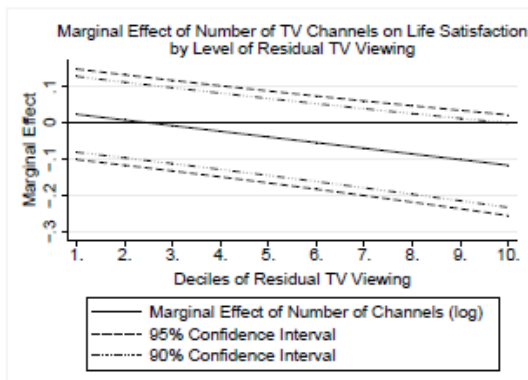
e) Residual TV viewing, calculated with full set of controls, specification based on categories of residual TV viewing

there is a linear relationship between residual TV viewing and the marginal effect of additional TV channels, as implied by the former specification. Figure 3e presents the results of the more flexible specification, which includes dummy variables for each decile of residual TV consumption. The calculated marginal effects of additional TV channels on life satisfaction show a similar pattern and magnitude as in the more rigid specification. The same holds when residual TV viewing is calculated only using age and sex as controls (see Figures 3b and c) or when including the mean adjusted level of TV consumption (see Figure 3a).

Thus, heavy TV viewers not only seem to benefit less from additional TV channels, but also experience a reduced level of life satisfaction. This finding is not consistent with a universe of sovereign TV consumers benefiting from a larger choice set. Rather, the finding suggests heterogeneity in self-control and is consistent with the view that part of observed individual TV consumption is due to a lack of willpower when exposed to the temptation of satisfying immediate pleasure. Referring to our graphical analysis in Section 2, on average, about 10% of the respondents (taking the 90% significance level as a cutoff point) experience a net welfare loss from an increase in the number of TV channels (i.e. area CHEF is larger than BHG). Applying the same statistical cutoff point, there is no group of respondents that experiences statistically significantly higher individual welfare if the number of TV channels is increased.

3.4 Robustness

In our robustness analysis, we address three alternative explanations for the observed patterns in the correlation between TV viewing and life satisfaction in relation to the number of TV channels. Moreover, we study the sensitivity of the results with regard to sample selection. All the tests are based on the indicator of TV consumption based on residual TV viewing calculated from a regression with a full set of controls (which led to the most conservative estimates as reported in Figure 3).

The first alternative questions the representativeness of the measure on the number of TV channels for the group of heavy TV viewers. A spurious negative correlation for the interaction term could emerge if the following scenario were to occur: In countries with few channels on average, only the rich and happy can afford satellite TV, have more channels than normal and therefore also watch more TV. In contrast, in countries where almost everyone has cable or satellite TV, people who watch a lot of TV tend to be unhappy, lonely or unemployed. Across countries, heavy TV viewers would seem less satisfied with more channels. A second alternative explanation suggests that TV markets with many channels rather than a few channels differ in other respects than just program variety. A concern about the documented relationship between TV channels and life satisfaction is therefore that it actually reflects some differences

between media markets rather than suboptimal decisions by some individuals. Third, the observed pattern could be the result of selection effects. Dissatisfied people more often watch TV to alleviate their miserable situation if more TV channels are available.

a) Measures of the number of TV channels

Our measure for the number of TV channels (i.e., the number of TV channels received by 70% of the population as published by IP Network) is arbitrary to some extent. All the same, it probably provides a good approximation of the average choice of TV programs in a country. Moreover, it is exogenous to individual choice, which fits the design of our empirical test. However, it does not take into account the variance of the number of TV channels within a country.

This aspect disturbs our testing strategy if (i) the number of TV channels at the individual level is correlated with individual TV viewing time and life satisfaction within a country and (ii) this correlation is systematically different between countries with a low aggregate number of TV channels and countries with a high aggregate number. In the scenario mentioned above, the happy heavy viewers in the (poor) countries with few TV channels might then be compared with the unhappy heavy viewers in the (affluent) countries with many TV channels. It is important to note, though, that any such effect needs to go beyond the individual characteristics (like income) controlled for in the estimation equations, determining the heavy viewers *separately* for each country sample.

In our first robustness check, we aim at compiling country samples of individuals for whom the information on the number of TV channels is representative. We do this by excluding observations at the tails of the distribution of residual TV viewing time, taking into account information on market penetration with terrestrial, cable and satellite TV. We apply the following procedure. Households with only terrestrial TV usually have access to only a few channels, while the offering is larger for households with cable or satellite TV. If 70% or more of the households in a country only have terrestrial TV, the measure on the number of TV channels available is probably sufficiently accurate for these households. However, it is not accurate for the households with cable or satellite TV. In this case, we exclude the percentage of respondents with cable or satellite TV from the analysis (i.e., the respective percentage of respondents with the highest residual TV viewing time). Accordingly, if 70% or more have access to cable or satellite TV, we exclude the percentage with only terrestrial TV (i.e., the respective percentage of respondents with the lowest residual TV viewing time). The exclusion procedure is thus based on the assumption also underlying the alternative hypothesis that the individual number of TV channels and individual (residual) TV viewing time are positively correlated within a country.

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Data on terrestrial cable and satellite diffusion are from IP Network and shown in Table A3 in the Appendix. The fraction of people who only have access to terrestrial TV in our data base is smallest in Luxembourg and the Netherlands (around 1%), and largest (in the early surveys) in Spain (92%), the Ukraine (93%) and Greece (99%). Table 2 presents the regression results after the samples have been adjusted. The number of country samples drops from 76 to 73 as the specific data is not available for 3 countries.[22] The number of observations drops from 127,949 to 88,424 due to the exclusion criteria described above.

Table 2: TV Consumption, Number of TV Channels and Life Satisfaction: Country Samples adjusted for the Diffusion of Terrestrial, Cable and Satellite TV

Dependent variable: Life satisfaction	(A)		(B)	
	Coefficient	t-value	Coefficient	t-value
Deciles of residual TV viewing (5th decile=0)	-0.006	-1.44	-0.006	-1.35
log (number of TV channels, mean adjusted)			-0.097	-1.52
Deciles of residual TV viewing * log (number of TV channels)	-0.023 **	-4.46	-0.024 **	-4.42
Individual control variables	Yes		Yes	
Country fixed effects	Yes		No	
Control variables at country level	No		Yes	
Year fixed effects	Yes		Yes	
Constant	6.869 **	53.69	-2.322	-1.21
Observations	88,421		88,421	
R^2	0.26		0.22	

Notes: (1) OLS estimates with standard errors adjusted for clustering at country level.
(2) ** significant at 99% level, * significant at 95% level, (*) significant at 90% level.
(3) Individual control variables are the same as in Table A2 and include income, age, gender, whether born in the country of residence or not, employment status, education, and marital status, as well as dummy variables indicating missing observations.
(4) Control variables at country level are the same as in Table A2 and include log GNI per capita (PPP) and average TV viewing time.
Data sources: European Social Survey (Wave 1 & 2), World Value Survey (Wave 3 & 4), IP Network (several years), World Development Indicators (several years).

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[22] The 3 country samples excluded are Macedonia, the Czech Republic, and Mexico for WVS 3. The difference between the results in Table 1 and Table 2 is not mainly due to this difference in observations.

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Otherwise, the estimates are based on the same specifications as those in Column (D) and (G) in Table 1. The results are robust to the adjustment of the samples. The estimated coefficient for the interaction term is even larger in absolute terms (-0.024) than in the baseline specification. Figure 4 shows the marginal effects of additional TV channels on life satisfaction. They are large, negative and statistically significant at the 95% level for intermediate and high levels of residual TV viewing time. Thus, the findings for the full country samples cannot easily be explained by differences in the diffusion of different TV technologies.

Figure 4: Number of TV Channels and Life Satisfaction: Country Samples adjusted for the Diffusion of Terrestrial, Cable and Satellite TV

a) Linear specification of residual TV viewing

b) Specification based on categories of residual TV viewing
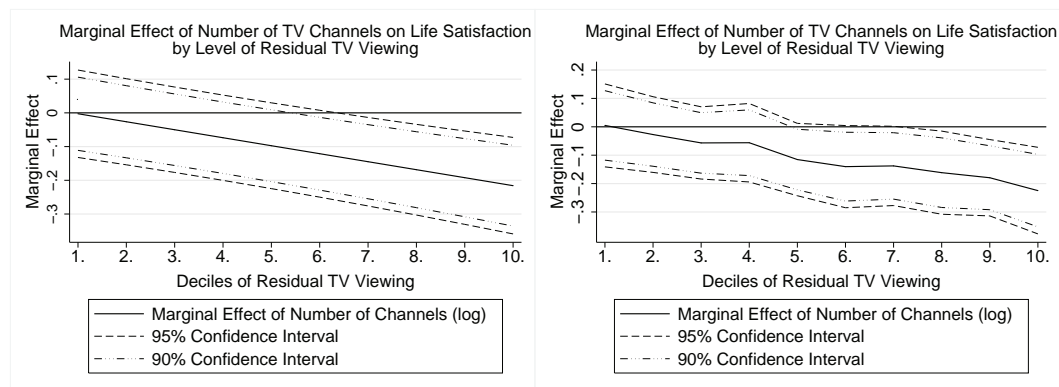
b) Young adult viewers and female viewers

The second robustness test looks at an alternative explanation of the partial correlations in terms of differences in media markets. In countries where people have access to more TV channels, TV markets tend to be less regulated and (annoying) commercial time might be higher. Some theoretical models of TV markets show a trade-off between diversity (i.e., number of channels) and the average quality of programs. In a population with heterogeneous preferences, some groups might therefore lose from an increased choice of programs (see, e.g., Liu et al. 2004; Anderson and Coate 2005; Liu et al. 2006). Furthermore, social costs might be associated with increased TV viewing due to the availability of more channels, even if the individual viewing choice were rational (see, e.g., Putnam 2000; Corneo 2005). Many of these possible market differences will affect heavy and light viewers alike and do not undermine our empirical test based on an interaction hypothesis. However, some differences might mainly impact

individuals with a high preference for TV viewing. To address this concern, we run our regressions for different subgroups of the population.

It is well-documented that in highly competitive TV markets, with many channels available, programs are tailored to particular viewer groups which are of specific interest to advertisers (see, e.g., Hamilton 2004 for a comprehensive discussion). These are mainly young adult viewers and female viewers (being the "main purchasers" in a household). In contrast, in less competitive markets with fewer channels, and to a large extent government or license-fee financed channels, programs are targeted at broader viewing groups. The young adult viewers and female viewers should thus have the most to gain – or the least to lose – when more channels are available. If the negative relationship between the number of TV channels and life satisfaction for heavy viewers is due to omitted market characteristics, rather than a lack of individual self-control, the relationship should be less pronounced or non-existent for these groups.

Table 3: TV Consumption, Number of TV Channels and Life Satisfaction of Young Adult Viewers and Female Viewers

Dependent variable: Life satisfaction	Young adult viewers (18-34)		Female viewers	
	Coefficient	t-value	Coefficient	t-value
Deciles of residual TV viewing (5th decile=0)	-0.014 **	-3.30	-0.012 **	-3.39
log (number of TV channels, mean adjusted)	-0.096 (*)	-1.69	-0.043	-0.66
Deciles of residual TV viewing * log (number of TV channels)	-0.015 **	-3.57	-0.016 **	-3.89
Individual control variables	Yes		Yes	
Control variables at country level	Yes		Yes	
Year fixed effects	Yes		Yes	
Constant	0.506	0.29	-3.310 (*)	-1.70
Observations	40,733		67,760	
R^2	0.15		0.21	

Notes: (1) OLS estimates with standard errors adjusted for clustering at country level.
(2) ** significant at 99% level, * significant at 95% level, (*) significant at 90% level.
(3) Individual control variables are the same as in Table A2 and include income, age, gender, whether born in the country of residence or not, employment status, education, and marital status, as well as dummy variables indicating missing observations.
(4) Control variables at country level are the same as in Table A2 and include log GNI per capita (PPP) and average TV viewing time.
Data sources: European Social Survey (Wave 1 & 2), World Value Survey (Wave 3 & 4), IP Network (several years), World Development Indicators (several years).

Figure 5: Number of TV Channels and Life Satisfaction of Young Adult Viewers and Female Viewers

a) Young adult viewers, linear specification
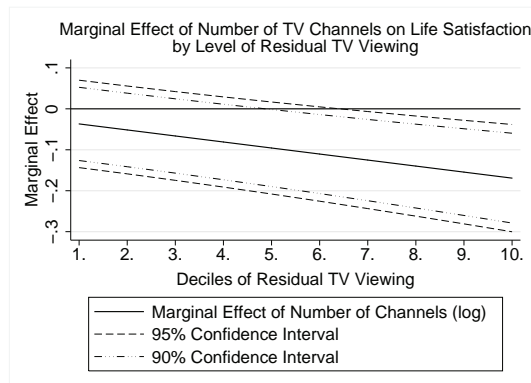
b) Young adult viewers, specification based on categories of residual TV viewing

c) Female viewers, linear specification
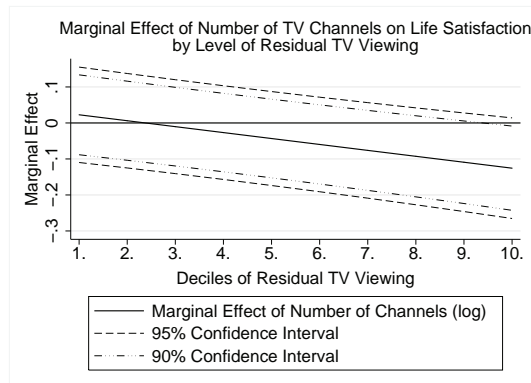
d) Female viewers, specification based on categories of residual TV viewing
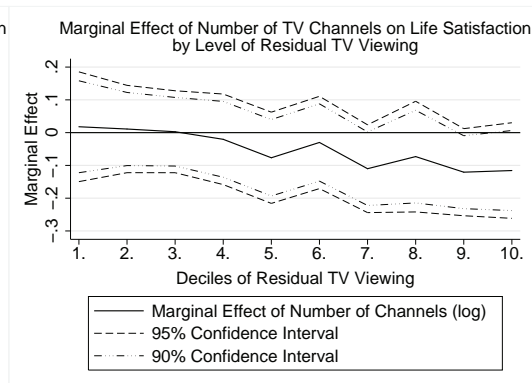
Table 3 presents the regression results for the specified age and gender groups. In comparison to the estimates for the entire population in Table 1, the size and the statistical significance of the coef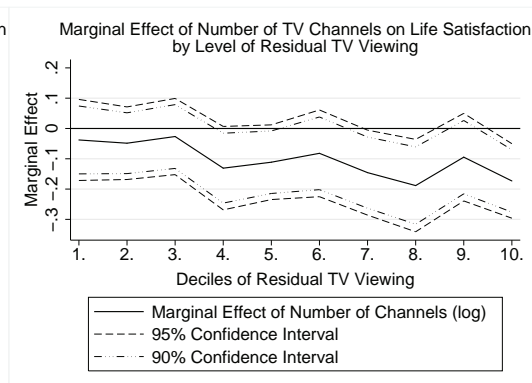ficients hardly change when looking only at young adult viewers aged from 18 to 34 (first regression in Table 3) or female viewers (second regression in Table 3). If anything, the marginal effect of the number of channels on life satisfaction for heavy viewers tends to increase and becomes statistically significant at higher levels (see Figure 5). This finding runs counter to the alternative explanation in terms of rational TV consumers, that differential effects of additional TV channels benefit some heavy TV viewers, while harming others. The groups most likely to benefit, young adult viewers and female viewers, who spend a lot of time watching TV, actually report lower life

satisfaction when they have access to more channels. The finding thus lends further support to the hypothesis that unpredictably heavy TV viewers face a problem of limited self-control when making their consumption decisions.

c) General resources for self-regulation

Our basic testing approach rests on the assumption that certain people will be heavy TV viewers regardless of the number of TV channels available. However, unhappy people might increasingly turn towards TV viewing if there are more TV channels available. This alternative explanation based on selection cannot easily be rejected empirically. We control for many observable characteristics that are correlated with low life-satisfaction levels. However, there may be unobserved characteristics that drive selection.

As an alternative strategy, we propose a refined interaction analysis and look for additional predictions that cannot easily be aligned with a selection explanation. Specifically, we are looking for a variable that helps to identify people ex ante who are more or less at risk of falling victim to temptations that challenge the implementation of their preferred plans of action. This follows the idea that people have a limited capacity for self-regulation (see Subsection 3.1, above).

Interestingly, involvement in religious activities has been found to positively correlate with measures of self-control and personality traits that subsume aspects of self-control. Religion can promote self-control insofar as it influences the selection, pursuit and management of goals and fosters self-monitoring and self-regulatory strength (see, e.g., McCullough and Willoughby 2009). This can be interpreted in terms of religious people possessing more willpower to stick to their planned allocation of time. Accordingly, it can be tested whether more religious people suffer less from self-control problems with regard to TV consumption and the temptations arising from an increased set of choices; i.e., the number of TV channels.

In an exploratory analysis, we implement the refined test by estimating a life satisfaction equation including, in addition to the variables in the baseline model, a three-way interaction between residual TV viewing, the number of TV channels and religiosity (plus all the relevant constitutive terms). Religious activity is measured in terms of frequency of religious service attendance (on a six-point scale ranging from "never" to "more than once a week"). We are aware that the distinction between religious and non-religious people is vague and encompasses such things as the differences in denominations, country-specific aspects of religious organizations, and individual differences in social capital. However, this differentiation is still appropriate to illustrate that our test strategy can be refined in order to provide additional testable predictions. In an attempt to take account of some of the general differences between countries, we use the

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deviation from the country median in our analysis.[23] We find that the estimated three-way interaction effect between residual TV viewing, the number of TV channels, and religiosity is indeed positive and statistically significant (0.003, t=1.82) (see Table 4). This means that, for religious people, the marginal effect of the number of TV channels on life satisfaction is statistically not significant for any level of residual TV viewing. In contrast, for non-religious individuals the marginal effect is similar to the effect in the baseline specification (i.e., negative and statistically significant at conventional levels for high residual TV viewing (see Figure 6)).

Table 4: TV Consumption, Number of TV Channels and Life Satisfaction of Religious and Non-Religious People

Dependent variable: Life satisfaction	Coefficient	t-value
Deciles of residual TV viewing (5th decile=0)	-0.011**	(-3.73)
log (number of TV channels, mean adjusted)	-0.047	(-0.73)
Religious activity (deviation from the country median)	0.093**	(7.76)
Deciles of residual TV viewing * log (number of TV channels)	-0.015**	(-4.00)
Deciles of residual TV viewing*religious activity	-0.002	(-1.11)
Religious activity* log (number of TV channels)	0.012	(1.19)
Religious activity*deciles of residual TV viewing * log (number of TV channels)	0.003(*)	(1.82)
Individual control variables	Yes	
Control variables at country level	Yes	
Year fixed effects	Yes	
Constant	-2.247	(-1.17)
Observations	127,413	
R^2	0.20	

Notes: (1) OLS estimates with standard errors adjusted for clustering at country level.
(2) ** significant at 99% level, * significant at 95% level, (*) significant at 90% level.
(3) Individual control variables are the same as in Table A2 and include income, age, gender, whether born in the country of residence or not, employment status, education, and marital status, as well as dummy variables indicating missing.
(4) Control variables at country level are the same as Table A2 and include log GNI per capita (PPP) and average TV viewing time.
Data sources: European Social Survey (Wave 1 & 2), World Value Survey (Wave 3 & 4), IP Network (several years), World Development Indicators (several years).

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[23] This religiosity indicator ranges from -4 to 5. If we just include religious attendance without adjustment into the regression, the three-way interaction term is not statistically significant at conventional levels.

Figure 6: Number of TV Channels and Life Satisfaction by Level of Religious Activity

Marginal Effect of Number of TV Channels on Life Satisfaction by Level of Residual TV Viewing and Religious Activity

** indicates significance at the 95% level
* indicates significance at the 90% level
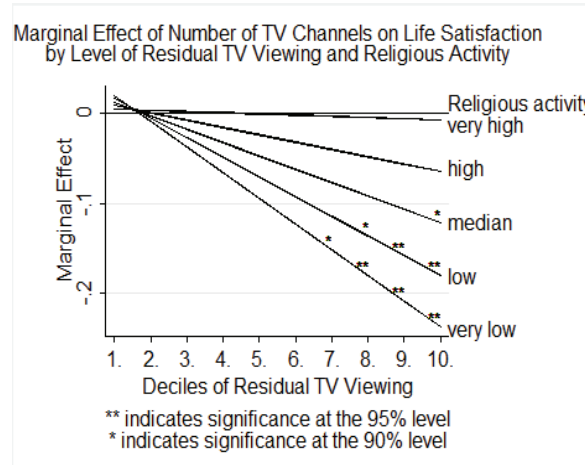
d) Sample Selection

In order to clarify whether the results are driven by some outliers, Figure 7 shows a scatter plot. For each country-wave, the partial correlation coefficient of residual TV viewing on life satisfaction (from a regression explaining life satisfaction with residual TV watching and controls) is plotted as a function of the corresponding number of TV channels. Each plotted dot is labeled with the abbreviated country name and the data source.

Overall, there exists a negative relationship between the estimated coefficients and the number of TV channels (as was to be expected from the regression analysis). Potentially influential observations become visible; if excluded from the analysis they lead to a decreased or increased interaction effect. For instance, if the observations for India (WVS3) and Bulgaria (WVS3) are excluded from the regression analysis, the interaction effect becomes somewhat smaller. In the regression for the whole sample, the coefficient drops from -0.016 (t=-4.04) to -0.012 (t=-3.99). However, it is still statistically significant at the 99% level.

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Figure 7: Marginal Effect of Residual TV Viewing on Life Satisfaction and Number of TV Channels by Country and Survey
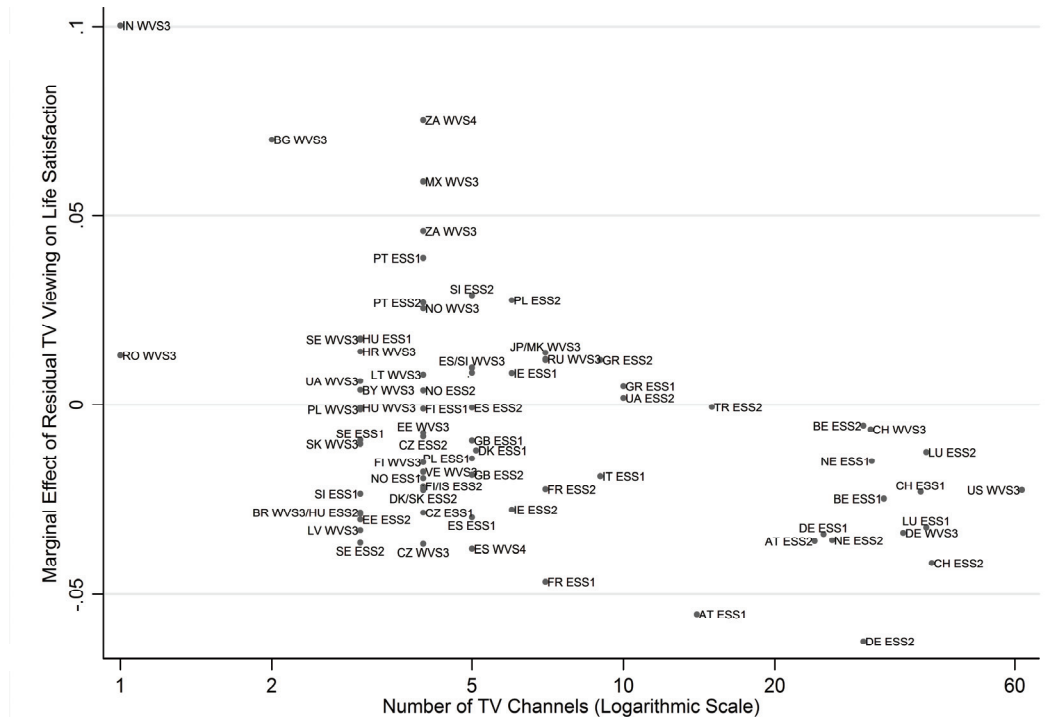
4. Concluding Remarks

Standard economic theory assumes that individuals are rational in the sense that they are able, first, to evaluate and decide on the optimal amount of consumption and, second, to implement their preferred consumption plan. In this framework, a larger set of choices is expected to increase (or at least not to decrease) individual welfare, as it enables people to better satisfy their preferences. Moreover, any change in observed consumption is considered an optimal adjustment to the larger choice set.

We challenge this view for the specific case of TV viewing and the expansion of TV accessibility providing people with more and more channels. We argue that observed TV consumption should not be considered optimal a priori. Instead a theoretical framework should be chosen that allows for the possibility of over-consumption. We propose a framework that includes people's limited willpower that is challenged by the immediate benefits of TV watching at negligible immediate marginal costs. We hypothesize and find evidence that some

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heavy TV viewers have a self-control problem that leads to excessive TV viewing and lower well-being according to their own evaluations.

We think that TV viewing is a particularly relevant issue for further research on optimal consumption choice because it is one of today's most time-consuming activities: in many countries, over the course of their lives, people spend, on average, as much time watching TV as they do working. Hardly anyone would deny that watching TV provides pleasure, at least some of the time, and that it is an important source of information. Yet, as our research suggests, some people are not able to optimally balance the benefits and the (future) costs associated with television consumption.

Our analysis explores the rationality of the level of TV consumption rather than of marginal reactions in consumption due to changes in relative prices. Valuable insights could be gained from further research in this direction. In fact, the most immediate consequence of television consumption, the immense time consumption, has so far received little attention in research. The growing body of work on the economics of time use (see, e.g., the collected studies in Hamermesh and Pfann 2005) will hopefully shed further light on how individuals allocate the ultimate scarce resource, time.

Appendix

Table A1: Descriptive Statistics

	Mean	Standard deviation	Median	Minimum	Maximum	Number of observations
TV viewing (hours)	1.98	1.06	1.75	0.00	3.50	127,949
Residual TV viewing (hours)	0.00	0.94	-0.02	-3.41	3.21	127,949
Life satisfaction	6.71	2.39	7.00	1.00	10.00	127,949
TV channels	10.33	12.55	4.50	1.00	62.00	76

Data sources: European Social Survey (Wave 1 & 2), World Value Survey (Wave 3 & 4), IP Network (several years).

Table A2: TV Consumption, Number of TV Channels and Life Satisfaction, Full Specification

Dependent variable: Life satisfaction	(A)	(D)	(G)
Deciles of residual TV viewing (5th decile=0)		-0.014** (-4.42)	-0.014** (-4.33)
log (number of TV channels, mean adjusted)	-0.047 (-0.73)		-0.039 (-0.61)
Deciles of residual TV viewing * log (number of TV channels)		-0.016** (-4.06)	-0.016** (-4.04)
Income deciles	0.106** (8.72)	0.112** (13.05)	0.105** (8.70)
Age	-0.087** (-18.37)	-0.081** (-17.38)	-0.087** (-18.39)
Age, squared	0.001** (18.51)	0.001** (17.56)	0.001** (18.54)
Male		Reference group	
Female	0.032 (1.04)	0.085** (4.82)	0.031 (1.04)
Not born in country of residence		Reference group	
Born in country of residence	0.358** (7.31)	0.217** (6.17)	0.358** (7.31)
Paid work, employed		Reference group	
Paid work, self-employed	0.258** (4.27)	0.084* (2.63)	0.258** (4.27)
Unemployed	-0.852** (-11.07)	-0.894** (-15.02)	-0.851** (-11.09)
Retired	-0.072* (-1.90)	-0.027 (-0.82)	-0.072* (-1.89)
In education	0.265** (5.51)	0.267** (6.22)	0.265** (5.51)
Housework, looking after children	0.245** (3.38)	0.051 (1.47)	0.246** (3.39)
Doing other work	-0.562** (-7.62)	-0.539** (-8.50)	-0.562** (-7.61)
No formal or incomplete primary education	-0.336** (-2.83)	-0.457** (-5.04)	-0.336** (-2.83)

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Table A2, continued

Complete basic or primary education		Reference group	
Upper or post secondary, non-tertiary educ.	0.076	0.161**	0.076
	(1.29)	(5.78)	(1.29)
Tertiary education	0.290**	0.295**	0.290**
	(4.88)	(7.65)	(4.87)
Married		Reference group	
Divorced	-0.625**	-0.620**	-0.625**
	(-12.94)	(-15.47)	(-12.94)
Separated	-0.844**	-0.882**	-0.844**
	(-11.27)	(-14.69)	(-11.26)
Widowed	-0.625**	-0.580**	-0.625**
	(-16.43)	(-16.11)	(-16.43)
Not married, living with partner	-0.246**	-0.312**	-0.246**
	(-4.99)	(-7.84)	(-5.00)
Not married, living without partner	-0.483**	-0.528**	-0.484**
	(-14.95)	(-19.19)	(-14.96)
GNI per capita (PPP), log	1.221**		1.221**
	(6.70)		(6.70)
Average TV viewing time in country (min.)	-0.010**		-0.010**
	(-5.06)		(-5.06)
Year fixed effects	Yes	Yes	Yes
Country fixed effects	No	Yes	No
Constant	-1.824	6.924**	-1.817
	(-0.93)	(56.44)	(-0.93)
Observations	127,949	127,949	127,949
R^2	0.20	0.25	0.20

Notes: (1) OLS estimates with standard errors adjusted for clustering at country level. t-values in parentheses.

(2) ** significant at 99% level, * significant at 95% level, (*) significant at 90% level.

(3) Dummy variables for the different countries and years are not shown. Dummy variables indicating missing observations for income, age, gender, country of birth, employment status, education, and marital status are also not shown.

Data sources: European Social Survey (Wave 1 & 2), World Value Survey (Wave 3 & 4), IP Network (several years), World Development Indicators (several years).

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Table A3: Diffusion of Terrestrial, Cable, and Satellite TV

Country	Survey	No. of TV channels for 70% of population	Only terrestrial TV	Cable or satellite TV
Austria	ESS 1	14	13%	87%
Austria	ESS 2	24	15%	85%
Belgium	ESS 1	32.5	3%	97%
Belgium	ESS 2	30	3%	97%
Brazil	WVS 3	3	89%	11%
Bulgaria	WVS 3	2	55%	45%
Belarus	WVS 3	3	83%	17%
Croatia	WVS 3	3	62%	38%
Czech Republic	ESS 1	4	71%	29%
Czech Republic	ESS 2	4	75%	25%
Czech Republic	WVS 3	4		
Denmark	ESS 1	5.5	17%	83%
Denmark	ESS 2	4	19%	81%
Estonia	ESS 2	3	49%	52%
Estonia	WVS 3	4	80%	20%
Finland	ESS 1	4	44%	56%
Finland	ESS 2	4	28%	72%
Finland	WVS 3	4	56%	44%
France	ESS 1	7	67%	33%
France	ESS 2	7	61%	39%
Germany	ESS 1	25	7%	93%
Germany	ESS 2	30	3%	97%
Germany	WVS 3	36	12%	88%
Greece	ESS 1	10	99%	1%
Greece	ESS 2	9	99%	1%
Hungary	ESS 1	3	37%	63%
Hungary	ESS 2	3	34%	66%
Hungary	WVS 3	3	20%	80%
Iceland	ESS 2	4	87%	13%
India	WVS 3	1	77%	23%
Ireland	ESS 1	6	40%	60%
Ireland	ESS 2	6	35%	65%
Italy	ESS 1	9	83%	17%
Japan	WVS 3	7	78%	22%
Latvia	WVS 3	3	69%	31%
Lithuania	WVS 3	4	78%	22%
Luxembourg	ESS 1	40	2%	98%

Table A3, continued

Luxembourg	ESS 2	40	1%	100%
Mexico	WVS 3	4		
Netherlands	ESS 1	29	1%	100%
Netherlands	ESS 2	26	1%	100%
Norway	ESS 1	4	31%	69%
Norway	ESS 2	4	28%	73%
Norway	WVS 3	4	44%	56%
Poland	ESS 1	5	42%	58%
Poland	ESS 2	6	47%	53%
Poland	WVS 3	3	51%	49%
Portugal	ESS 1	4	57%	43%
Portugal	ESS 2	4	50%	51%
Romania	WVS 3	1	46%	54%
Russia	WVS 3	7	83%	17%
Slovakia	ESS 2	4	52%	48%
Slovakia	WVS 3	3	20%	80%
Slovenia	ESS 1	3	35%	65%
Slovenia	ESS 2	5	33%	67%
Slovenia	WVS 3	5	51%	49%
South Africa	WVS 3	4	80%	20%
South Africa	WVS 4	4	78%	22%
Spain	ESS 1	5	78%	22%
Spain	ESS 2	5	72%	29%
Spain	WVS 3	5	92%	8%
Spain	WVS 4	5	61%	39%
Sweden	ESS 1	3	28%	72%
Sweden	ESS 2	3	24%	77%
Sweden	WVS 3	3	37%	63%
Switzerland	ESS 1	39	5%	95%
Switzerland	ESS 2	41	6%	95%
Switzerland	WVS 3	31	23%	77%
Turkey	ESS 2	15	68%	32%
Ukraine	ESS 2	10	58%	42%
Ukraine	WVS 3	3	93%	7%
Macedonia	WVS 3	7		
Great Britain	ESS 1	5	53%	47%
Great Britain	ESS 2	5	36%	64%
United States	WVS 3	62	27%	73%
Venezuela	WVS 3	4	86%	14%

Data Source: IP Network (several years).

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