Does the internet make us happier?

A research synthesis using an online findings archive[1]

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The Issue: The internet already has a strong influence on our professional and private lives and the importance of the internet and information technology in general will grow further in the years to come. Though welcomed by some, this development is deplored by others and a discourse on the treads in internet has developed. Which view is the most realistic?

Research questions: The internet involves positive and negative effects, the balance of which will reflect in happiness. Hence the issue can be clarified by considering the relationship between the internet and happiness. Is it a positive relationship, a negative one or do these effects balance? Under what circumstances does the internet add to happiness and when should we avoid staring at a screen? For what purposes is the use of internet most beneficial? Are certain people more vulnerable for the negative effects of using the internet?

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Method: We considered the results published in 34 research reports on the relation between internet and happiness, which together yielded 117 findings. We reviewed these findings, using a new technique. The findings were entered in an online 'findings archive', the World Database of Happiness, and each described in a standardized format on a separate 'findings page' with a unique internet address. In this paper, we use links to these finding pages and this allows us to summarize the main trends in the findings in a few tabular schemes.

Results: The relationship between internet and happiness differs across aspects of internet usage and different age groups. Access to internet relates positively to happiness, but time spend on internet often relates negatively. Young people, (adolescents and young adults) tend to be less happy the more they use the internet, while seniors (65+) profit from having internet access.

Keywords: happiness, internet, information technology, research synthesis

1. Introduction

The internet is becoming increasingly dominant in people's lives. People are connected at work and in their leisure time. Checking the internet is often the first thing people do when they get out of bed in the morning and the last thing they do before going to sleep.

Blessing or curse?

The internet is in many cases making our lives more convenient. We can easily find information, navigate and communicate within our social networks. But the internet can also cause addiction and social isolation. These pros and cons are the subject of an ongoing public debate, in which negative views dominate in spite of increasing use of the technology.

Research on relation between internet and happiness

The balance of these positive and negative effects of internet will reflect in the happiness of its users. For that reason, researchers have started to investigate the

relationship between the use of internet and happiness. In this paper we review the results of this research.

Stakeholders

This research will serve the information demands of the internet industries, organizations in general, policy makers and individual citizens.

- *Internet industries:* Responsible business operation involves a realistic view on the effect of products and services on individual consumers and society as a whole. Happiness is a key effect to be considered. In this case of the internet industries, a first question is how much truth is there in the claims of a negative effect of internet use on human happiness. Is this mere conservatism or does internet really harm? If internet lowers happiness, a second question is: How this can be prevented? which raises further questions on causal mechanisms and contextual variations.
- *Organizations in general:* Companies and governmental organizations want their employees to be happy. Happy employees are more productive, more collaborative and healthier. The influence of IT and the internet in the working environment has grown significantly and it will only grow further. Almost all employee work with internet or will do so in the near future, and because of this the relationship between the internet and happiness is becoming more important for organizations in general.
- *Policy makers:* Answers to the above question will also play a role in several choices governments must make, such as pushing or restraining ongoing digitalization and whether or not to invest in prevention of harmful internet behaviour.
- *Individual citizens*: Knowing to what extent the internet affects our happiness is important. We are concerned about our own happiness and the happiness of our children, parents and friends. Finding ways of increasing happiness for ourselves and for our loved ones is probably one of the key goals in life. Some determinants of happiness are beyond our control, but if and how we use the internet is largely in our own hands.

Research problems

There are quite a few complications when it comes to empirical assessment of the effects of the internet on happiness. The effects may differ across people and situations. The internet is a relatively new technology and is developing at an incredibly fast rate, such that the ongoing development may change its relationship with happiness, e.g. because of improvements in the technology and greater ability to handle it. Then there is the question of causality; a negative correlation may mean that use of the internet lowers happiness or that unhappy people use the internet more. In this paper we try to untangle these relationships.

1.1 Research questions

1. Does use of the internet go with greater happiness, less happiness or is there no correlation?
2. What aspects of internet use are the most and least related to happiness?
3. Do the correlations between internet use and happiness differ across kinds of people? If so, are there any groups in which negative relations stand out?
4. Under what circumstances is the relationship between internet usage and happiness positive and when is the effect negative.
5. What is the direction of causality behind observed statistical relationships between use of the internet and happiness?
6. Are there clues about causal mechanisms that drive these effects?

1.2 Approach

We explored answers to these questions in the available research literature and took stock of the findings obtained in quantitative studies on the relation between internet usage and happiness. We applied a new technique for research reviewing, that takes advantage of an on-line findings archive, the World Database of Happiness, which allowed us to present a lot of findings in a few easy to oversee tabular schemes.

1.3 Structure of the paper

The remainder of this paper is organized as follows. We define our key concepts in section 2; internet usage and happiness and give a short account of happiness research. Next, we describe the new review technique in more detail: how we

gathered the available research findings and how we presented these in an easy to overview way in section 3. Then we discuss what answers the available findings have provided for our research questions in section 4. We discuss these findings in section 5 and draw conclusions in section 6.

2. CONCEPTS and MEASURES

There are different views on what constitutes the 'internet' and 'happiness'; for this reason, a delineation of these notions is required.

2.1 Internet

The internet is a part of modern electronic information technology. Wikipedia describes it as "the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link devices worldwide. It is a *network of networks* that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries a vast range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony and file sharing". The internet is used for professional and for private purposes and forms the backbone of social media, such Facebook.

2.2. Happiness

Throughout history, the word 'happiness' has been used to denote different concepts that can be loosely connected. Philosophers typically used that word to denote living a good life and often emphasize moral behaviour. 'Happiness' has also been used to denote good living conditions and associated with material affluence and physical safety. Today, many social scientists use the word to denote subjective satisfaction with life, which is also referred to as subjective well-being (SWB).

2.2.1 Definition of happiness

In that latter line, Veenhoven (1984:22) defines happiness as the degree to which an individual judges the overall quality of his/her life-as-a-whole favourably and in a later paper distinguished this definition of happiness from other notions of the good life (Veenhoven 2000). In this paper, we follow the above conceptualization as it is

also the focus of the World Database of Happiness (Veenhoven 2018) from which the data reported in this paper are drawn.

2.2.1.1 Components of happiness

Our overall evaluation of life draws on two sources of information: (1) how well one feels most of the time and (2) to what extent one perceives one is getting from life what one wants from it. We refer to these sub-assessments as ‘components’ of happiness, called respectively ‘hedonic level of affect' and 'contentment' (Veenhoven 1984: 25-27). The affective component tends to dominate in the overall evaluation of life (Kainulainen et al. 2018).

2.2.1.2 Difference with wider notions of wellbeing

Happiness in the sense of the ‘subjective enjoyment of one’s life-as-a-whole’, should not be equated with satisfaction with domains of life, such as satisfaction with one’s life-style. Likewise, happiness in the sense of the ‘subjective enjoyment of one’s life’ should not be equated with ‘objective’ notions of what is a good life, which are sometimes denoted using the same term. Though strongly related to happiness, mental health is not the same; one can be pathologically happy or be happy in spite of a psychological condition. Differences in wider notions of well-being are discussed in more detail in Veenhoven (2018a chapter 2).

2.2.2 Measurement of happiness

Since happiness is defined as something that is on our mind, it can be measured using questioning. Various ways of questioning have been used, direct questions as well as indirect questions, open questions and closed questions and one-time retrospective questions and repeated questions on happiness in the moment.

Not all questions used fit the above definition of happiness adequately, e.g. not the question whether one thinks one is happier than most people of one’s age, which is an item in the Subjective Happiness Scale (SHS) of Lyubomirski & Lepper (1999). Findings obtained using such invalid measures are not included in the World Database of Happiness and hence were not considered in this research synthesis. Further detail on the validity assessment of questions on happiness is available in the introductory text to the collection Measures of Happiness of the World Database

of Happiness (Veenhoven 2018b, chapter 4). Some illustrative questions deemed valid for archiving in the WDH are presented below.

- Question on overall happiness:
  Taking all together, how happy would you say you are these days?

- Questions on hedonic level of affect:
  Would you say that you are usually cheerful or dejected? How is your mood today? (Repeated several days)

- Questions on contentment:
  1) How important are each of these goals for you?
  2) How successful have you been in the pursuit of these goals?

2.2.3 Happiness research

As the readers of this paper may not be familiar with the scientific study of happiness, as defined above in section 2.1, the following information will be useful.

2.2.3.1 Rise of empirical research

Over the ages happiness has been a subject of philosophical speculation and in the second half of the 20th century it also became the subject of empirical research. In the 1960's, happiness appeared as a side-subject in research on successful aging (e.g. Neugarten et al. 1961) and mental health (e.g. Gurin et al. 1960). In the 1970's happiness became a topic in social indicators research (Veenhoven 2017) and in the 1980s in medical quality of life research (e.g. Calman, 1984). Since the 2000's, happiness has become a main subject in the fields of 'Positive Psychology' (e.g. Lyubomirsky 2008) and 'Happiness Economics' (e.g. Bruni & Porta, 2000).

All this has resulted in a spectacular rise in the number of scholarly publications on happiness and in the past year (2018) some 800 new research reports were published. To date (June 2019), the Bibliography of Happiness list 7201 reports of empirical studies in which a valid measure of happiness has been used (Veenhoven 2019a).

2.2.3.2 Findings archive: The World Database of Happiness.

This flow of research findings on happiness has grown too big to oversee, even for

specialists. For this reason, a findings archive has been established, in which quantitative outcomes are presented in a uniform format and are sorted by subject. This 'World Database of Happiness' is freely available on the internet (Veenhoven 2019). Its structure is shown on Figure 1 and a recent description of this novel technique for the accumulation of research findings can be found with Veenhoven (2019g). One of the subject categories in the collection of correlational findings is 'Happiness and Internet' (Veenhoven 2019d) and we draw on this source for this paper.

Go to Figure 1

3. METHODS

A first step in this review was to gather the available quantitative research findings on the relationship between internet usage and happiness. The second step was to present these findings in an uncomplicated form.

3.1 Gathering of research findings

In order to identify relevant papers for this synthesis, we inspected which publications on the subject of internet were already included of the Bibliography of World Database of Happiness, in the subject sections Internet penetration in nations, personal internet access, personal internet proficiency and internet training, personal internet use and personal internet addiction. Then to complete the collection of studies further, we searched Google Scholar.

All reviewed studies had to meet the following criteria.

1. A report on the study should be available in English, French, German or Spanish.
2. The study should concern happiness in the sense of life-satisfaction (cf. section 2.1). We excluded studies on related matters, such as on mental health or wider notions of 'flourishing'.
3. The study should involve a valid measure of happiness (cf. section 2.2). We excluded scales that involved questions on different matters, such as the much-used Satisfaction with Life Scale (Diener et al 1985).
4. The study results had to be expressed using some type of quantitative analysis.

3.2 Studies found

We found 34 reports of an empirical investigation that had examined the relationship between aspects of internet use and happiness, of which two were working papers and one a master thesis. None of these *publication*s reported more than one *study*. The studies yielded 117 *findings.* All the papers were fairly recent, having been published between 1999 and 2019.

Together, the studies covered 1.055.826 respondents and over 100 different countries. The publics investigated in these studies, included the general population in countries and particular groups such as adolescents and the elderly. Six studies focused on internet users and two out of this six specifically focussed on social media users.

We present an overview of all the included studies, including information about population, measures and publication in table 1.

Go to Table 1

3.3 Format of this research synthesis

As announced, we applied a new technique of research reviewing, taking advantage of two technical innovations: a) The availability of an on-line findings-archive (the World Database of Happiness) that holds descriptions of research findings in a standard format and terminology, presented on separate *finding pages* with a unique internet address. b) The change in academic publishing from print on paper to electronic text read on screen, into which *links* to that online information can be inserted.

3.3.1 Links to online detail

In this review, we summarize the observed statistical relationships as **+, –** or **0** signs[4]. These signs link to finding pages in the World Database of Happiness, which serves as an online appendix in this article. If you click on a sign, one such a finding page will open, on which you can see full details of the observed relationship; of the people investigated, sampling, the measurement of both variables and the statistical

[4] The technique also allows summarization in a number, which can be presented in a stem-leaf diagram, or in short verbal. statements, such as 'U shaped relationship'

analysis. An example of such an electronic finding page is presented in Figure 2. This technique allows us to present the main trends in the findings without burdening the reader with all the details while keeping the paper to a controllable size, at the same time allowing the reader to check in depth any detail they wish.

3.3.2 *Organization of the findings*

We first sorted the findings by the research method used and these are presented in three separate columns of tables 2 and 3. We distinguished a) *cross-sectional* studies, assessing same-time relationships between use of the internet and happiness, b) *longitudinal* studies, assessing change in happiness following changes in internet use, and c) *experimental* studies, assessing the effect of induced changes in internet behaviour on happiness.

In the tables, we distinguish between studies at the *micro* level, in which the relation between internet behaviour and happiness of individuals was assessed and studies at the *macro* level, in which average internet access and internet behaviour in nations are linked to the average happiness of citizens.

We present *internet variables* vertically and horizontally two *kinds of happiness:* overall happiness (life-satisfaction) and hedonic level of affect.

3.3.3 *Presentation of the findings*

The observed quantitative relationships between aspects of internet and happiness are summarized using 3 possible signs: + for a positive relationship, – for a negative relationship and **0** for a non-relationship. Statistical significance is indicated by printing the sign in **bold**. See tables 2 and 3. Each sign contains a link to a particular 'finding page' in the World Database of Happiness, where you can find more detail on the checked finding. An example of such a findings page is presented in Figure 2.

Some of the findings appear in more than one cell of a table. This is the case for pages on which a 'raw' (zero-order) correlation is reported next to a 'partial' correlation in which the effect of control variables is removed. Several cells in the tables remain empty and these denote blanks in our knowledge.

Go to Figure 2

3.3.4 Advantages and disadvantages of this review technique

There are pros and cons to the use of a findings-archive such as the World Database of Happiness and plusses and minuses to the use of links to an on-line source in a text like this one.

Use of a findings-archive: Advantages are: a) efficient *gathering* of research on a particular topic, happiness in this case, b) sharp *conceptual focus* and selection of studies on that basis, c) *uniform description* of research findings on electronic finding pages, using a standard format and a technical terminology, d) *storage* of these finding pages in a well searchable database, e) which is *available on-line* and f) to which *links* can be made from texts. The technique is particular useful for ongoing harvesting of research findings on a particular subject.

Disadvantages are: a) the sharp conceptual focus cannot easily be changed, b) considerable investment is required to develop explicit criteria for inclusion in the findings archive, definition of technical terms and software[5], c) which pays only when a lot of research is processed on a continuous basis.

Use of links in a review paper: The use of links to an on-line source allows us to provide extremely short summaries of research findings, in this text by using **+, –** and **0** signs, in bold or not, while allowing the reader access to the full details of the research. This technique was used in an earlier research synthesis on wealth and happiness (Jantsch & Veenhoven 2019) and is described in more detail in Veenhoven (2019). Advantages of such representation are: a) an easy overview of the main trend in the findings, in this case a mixed pattern of + and **–** signs, b) access to the full details behind the links, c) an easy overview of the white spots in the empty cells in the tables, and d) easy updates, by entering new sign in the tables, possibly marked with a colour.

The disadvantages are: a) much of the detailed information is not directly visible in the + and – signs, b) in particular not the effect size and control variables used, and c) the links work only for electronic texts.

[5] The archive can be easily adjusted for other subjects. The software is Open Source

3.3.5 *Differences with traditional reviewing*

Usual review articles cannot report much detail about the studies considered and rely heavily on references to the research reports read by the reviewer, which typically figure in a long list at the end of the review paper that the reader can hardly check. As such, these reviews are vulnerable to interpretations made by the reviewer and methodological variation can escape the eye.

Another difference is that the conceptual focus of many traditional reviews in this field is often loose, covering fuzzy notions of ‘well-being’ rather than a well-defined concept of ‘happiness’ as used here. This blurs the view on what the data tell and involves a risk of ‘cherry picking’ by reviewers. A related difference is that traditional reviews of happiness research often assume that the name of a questionnaire corresponds with its conceptual contents. Yet, several ‘happiness scales’ measure things other than happiness as defined in section 2.2.2, e.g. much used Life Satisfaction Scale (Neugarten et al 1961), which measures social functioning.

Still another difference is that traditional narrative reviews focus on interpretations advanced by authors of research reports, while in this quantitative research synthesis we focus on the data as presented.

3.3.6 *Difference with traditional meta-analysis*

Though this research synthesis is a kind of meta-analysis, it differs from common meta-analytic studies in several ways. One difference is the above- mentioned conceptual rigor; like narrative reviews, many meta-analyses look to the names given to variables for their content, thus adding apples and oranges and comparing chalk and cheese. Another difference is the availability of direct online access to full details of the research findings considered, presented in a standard format and terminology, while traditional meta-analytic studies just provide a reference to research reports from which the data were taken. A last difference is that most traditional meta-analytic studies aim at summarizing the research findings in numbers, such as an average effect size. Such quantification is almost not possible for the data at hand here and is not required for answering our research questions. Our presentation of the separate findings in tabular schemes provides more information, both of the general tendency and of the details, in a simple ‘overview’ manner.

4 RESULTS

An overview of the findings is presented in table 2**.** At a glance two patterns appear. With respect to the *methods* used, the reader can see that most of the findings are based on cross-sectional data, that is, comparisons of happiness and internet at the same time. Only four findings are based on a follow-up study and only one on an experiment. With respect to the *outcomes* a mixed picture appears, with plusses and minuses varying across and within rows and columns. On that basis we can now answer our research questions.

Go to Table 2

4.1 Is there a correlation between internet usage and happiness?

In total we collected 117 findings from 34 different research reports. Of these findings 110 showed a correlation between happiness and internet usage, 7 findings showed no relationship at all. Of the 117 findings 47 were statistically significant.

4.1.1 Real correlation

When looking for a relationship between two variables one should always be aware of the possibility of a third variable influencing both variables. For example; when we find a relationship between internet use and happiness, it could be the case that level of education actually influences both variables. People who have a higher level of education more often have internet access and are also happier. Most findings (86/117) however were 'partial' correlations, in which the statistical effect of control variables (e.g. education, income, gender, marital status, employment status) has been removed. The control variables used differed across studies, so the interested reader should check case by case, clicking the signs in table 2.

Removing the effect of possible spurious correlation involves the risk of over-control. When too many variables are controlled all possible correlation may disappear, including an existing relationship between internet use and happiness. For example, we found that adolescents and young adults were more vulnerable to excessive internet usage (see 4.4.2), which is related to spending time on the internet and social media usage. When studies control for age and income this relationship will disappear, with the risk of ignoring a relevant finding.

With these limitations in mind, it is notable that the partial correlations did not differ very much from the zero-order correlations shown in table 2. Exceptions are the cases of *time on internet* and use of *social media* where significant negative zero-order correlations appear next to significant positive partial correlations. This is probably a reflection of the dissimilar relationships we for different groups. Younger people and people who are socially isolated often show a negative relation between time on the internet and happiness, while elderly and people with a rich social life seem to profit from time spend on the internet and social media. So when a partial correlation controls for age or social connections the direction of the relationship may flip.

4.1.2 Direction of the correlation

Of the 117 findings 46 showed a positive relationship of happiness and internet usage and 64 showed a negative relationship, 7 findings showed no relationship. When we only consider the 47 statistically significant results 27 (57%) of these showed a positive relationship to happiness and 20 (43%) findings showed a negative effect. Of the 63 non-significant findings 19 (30%) showed a positive relationship and 44 (70%) a negative one. So, when all results are considered we found more negative relationships, but when only the significant results are considered the positive relationships are more frequent.

Positive versus negative ratio

One could argue that the significant results are more important than non-significant findings. Calculating a ratio where significant results count double is a way to bring this into the equation. When we calculated this, we found a positive versus negative ratio of 0,87, see table 3. According to this ratio one could argue that internet use has a slightly negative effect on happiness, but as the ratio is close to 1, it is probably more justified to say that the positive and negative effects are more or less in balance.

Go to Table 3

When we looked at the ‘raw’ (zero-order) findings the positive/ negative ratio was 0,59 (10/17). In the findings reporting partial correlations the ratio was 0,80 (37/46). When we looked only at findings with partial correlations that were significant, the

ratio was 1,58 (19/12). Of the zero-order findings only 6 correlations were significant and they were all negative. When we combined significant and non-significant in a ratio where significant results were counted double, as we did before, the positive versus negative ratio was 0,43 (10/23) for zero-order correlations and 0,93 (54/58) for partial correlations. So, when only the significant results were considered that control for spuriousness, an almost equal amount of negative and positive relationships between happiness and internet usage were found.

4.1.3 Size of the correlations

When we looked at the size of the zero order correlations, they were generally small. Very few correlations were larger than .20. The positive correlation found by Böhnke et al. (2008) is one of the exceptions (b=+.58). They found that people in Turkey that are connected to the Internet are considerably more satisfied with their lives, although much of this effect is based on the socio-economic status of the typical Internet user. Oh et al. (2004) found a positive relationship of considerable size for people who feel connected to their social network and life satisfaction (r=+.48) and also for people who have trust in their social network and happiness (r=+.37). This might be related to social media usage, but it could also mean that these people have better social connections in general, which we know is one of the best predictors of happiness. In which case the relationship that Oh et al. (2004) found is just a reflection of the social connections of the respondents' offline life. The negative correlations we found between internet usage and happiness were all quite small, most of them smaller than r= -.10. The relationship with perceived internet addiction (Yoo et al. 2014) and happiness was the largest negative effect (r=-.20).

4.2 What aspects of internet use are the most and least related to happiness?

The different aspects of the internet evaluated in the various studies have a dissimilar effect on happiness. We will discuss the different aspects separately.

4.2.1 General internet usage

If we only look at general internet usage, we find a positive relationship with happiness. Access to internet (3 findings, all significant) and the ability to use the internet (1 finding, not significant) are positive related to happiness. Usage of the

internet (versus non-usage) generally show a positive relationship too (9 significant positive findings versus 2 nonsignificant negative finding). The negative relationships were part of the study of Pierewan et al. (2014a) who found a nonsignificant negative relationship before the financial crises (2 findings; 2004, 2006) and a significant positive one during the crisis (2 findings; 2008, 2010).

4.2.2 Time om internet

Spending time on internet (58 findings) is negatively correlated with happiness in most findings (38 findings are negative, 16 findings are positive and 4 are neutral). Often the negative findings are related to excessive use (f.e. Brkliacic et al., 2018) or problematic internet use (Lachmann et al., 2016). Problematic Internet use (PIU) or Internet Addiction Disorder (IAD) is characterized by excessive or poorly controlled preoccupations, urges, or behaviours regarding computer use and Internet access that lead to impairment or distress (Weinstein et. Al., 2014). Adolescents especially (f.e. Yoo et al., 2014), young adults and people who feel disconnected and lonely (Arampatzi et al., 2012) show a negative relationship with spending (too much) time on internet and happiness.

4.2.3 What internet is used for

Shopping online is positively related to satisfaction with life (Lissitsa et al., 2016, 1 finding), while online gaming does not seem to influence life satisfaction either a positive or a negative way (Lissitsa et al., 2016, 1 finding). Reading e-mail many times a day goes with unhappiness (4 findings, 3 negative). Information seeking is sometimes found positive (2 findings) in relation to happiness and sometimes negative (2 findings).

Social Media:

Most studies that examined the relationship between social media use and happiness report negative findings (21 findings, 14 negative, 5 positive, 2 neutral). When people use social media in an authentic (showing the ‘real self’) way it can add to happiness (Reinecke et al., 2014, 4 findings, all positive, two longitudinal). Reinecke illustrates that only people with high levels of well-being profit from this beneficial effect of authentic communication on social network sites. They explain this as a ‘positivity bias in social network communication’; positive forms of authenticity are favoured over negative ones, so for people with low levels of well-

being it is harder to be authentic and report on their lives in a way that is expected in social networks. The Reinecke study suggests that social media makes happy people happier and unhappy people unhappier.

4.3 Does internet use influence the happiness of different groups differently?

Reviewing the different findings, it becomes clear that the relationship between use of the internet and happiness is not the same for the different groups in the studies, age-differences especially strike the eye. We provide an overview of these age differences in table 2a, which is a copy of table 2 in which we used colours to mark signs that pertain to particular age groups.

Adolescents especially and young adults seem vulnerable to Problematic Internet use (PIU). All the findings that specifically look into these younger groups show a negative (14 findings) or neutral (5 findings) relationship between internet usage and happiness. Furthermore, a study by Arampatzi et al. (2012) shows that spending time on social media networks correlates negatively to happiness for people who feel socially disconnected and lonely. Another study (Nie et al., 2015) point to a possible cultural factor that puts Chinese Internet users at psychological risk.

In contrast to youngsters, senior citizens (65+) seem to thrive on internet use. All five findings concerning this group are positive. Other groups that show a positive relationship between internet usage and happiness are people from weaker social groups: people from low economic strata, those suffering from health problems (Lissitsa et al., 2016), people with fewer educational qualifications or women, especially from developing countries (BCS, 2010).

Go to Table 2a

4.4 Under what circumstances is the relationship between internet usage and happiness positive and when is the effect negative?

Theoretically one can think of many contextual moderators, which can figure at the macro level of society, the meso level of social institutions and at the micro level of individuals. Empirically, the available research shows only a few variations.

4.4.1 Macro level moderators

One study (Pierewan et al., 2014a) examines this association before and during the financial crisis in Europe in the period 2004-2010 (the crisis started in 2007). They found that internet use is not associated with well-being before the crisis, whilst they find a positive relationship during the crisis. Beyond this they found that using the internet to respond to a situation of unemployment may help individuals to improved well-being.

4.4.2 Micro level moderators

A great deal of the correlation appears to depend on the attitudes people have towards the internet. A negative relation between internet usage and life satisfaction is found when people consider themselves to be addicted to the internet (Yoo et al., 2014, 4 findings, all negative) or when they catch themselves envying other people on Facebook (Krasnova et al., 2013, one finding). Positive relations are found when people feel connection, trust, closeness and support in relation to their social network online (Oh et al., 2014).

4.5 Causality

Assessing *how* internet use relates to happiness is one thing, but the stakeholders, mentioned in the introduction to this paper, would also like to know *why* these statistical relations exist and in particular what causes what through which mechanisms.

4.5.1 Direction of causality

When we find a positive relationship between internet usage and happiness this does not mean that the internet use causes happiness. It may simply be the case that happy people use the internet more. The findings from cross-sectional studies in table 2 do not inform us about the direction of causality, but the few longitudinal

findings and the one experimental finding in the right hand columns do.

Two longitudinal studies (Kross et al., 2013, 4 findings, Orben et al., 2019, 2 findings) show a negative effect of internet use on happiness and one longitudinal study finds a positive effect (Reinecke & Trepte, 2014, 2 findings).

One experimental study also found a positive relationship (White et al., 1999, one finding). Social media usage can apparently have a negative effect on the subjective well-being (Kross et al. 2013, & Orben et al., 2019) but internet use can also have a positive effect on happiness (Reinecke et al., 2014) for people with high levels of well-being who show authentic behaviour online.

A positive causal effect of internet use on happiness is also found in a longitudinal study examining the effect of a computer training amongst elderly. These studies show that causal relationships between internet usage and happiness exist but that the direction depends on the age group and the way in which the internet is used.

4.5.2 Causal mechanisms

Positive and negative effects of internet use on happiness can be driven by various underlying causes. One such causal mechanism, commonly mentioned in the public debate, is that the use of internet will create envy, the use of social media in particular. Another common lay-theory is that frequent on-line contacts go at the cost of real-life social contacts and as such impedes meeting our innate need for intimacy.

These two explanations can be linked to the two ‘components’ of happiness, discussed in section 2.2.1.1, in particular when seen in the context of Veenhoven’s (2000) theory of happiness. This theory holds that the affective component of happiness (how well one feels most of the time) reflects the extent to which innate *needs* are being gratified, while the cognitive component (seeing to get what you want) reflects the degree to which culturally variable *wants* are met.

If deprivation of an innate need for face-to-face contact is the case, we would expect more pronounced correlations with the affective component, contact-deprived internet users feeling miserable, typically without knowing why. If ‘envy’ was a main causal effect, that should reflect in stronger correlations with the cognitive component of happiness than with the affective component, because the effect of internet use on happiness is in cognitive comparison with the overly positive self-

presentations of internet friends.

Looking for evidence in the available data, we made another variant of table 2, in which we specified the findings by the kind of happiness measures used. Again, we did so using colours. See Table 2b.

Go to Table 2b

Findings obtained using a measure of the affective component of happiness are marked blue, and this colour stands out in the strong correlations between happiness and perceived 'authenticity' of contacts with social network friends, as the above theory would predict. However, the available data do not allow a comparison with findings obtained using a measure of the cognitive component of happiness.

Comparison between the size of correlations yielded with measures of both the affective and cognitive component of happiness was possible in the case of 'time on internet', where the negative correlation with a cognitive measure of happiness was stronger than with a measure that also taps affective experience (Tambyah 2009). This pattern does not appear in the study of Shu & Zhu (2009). The Tambyah finding would fit the theory that use of social media feeds discontent, because users tend to exaggerate how well they are doing. However, social media are not included in this measure of time on the internet.

5 DISCUSSION

5.1 Verbal summary

Having access to internet and being able to use the internet tends to go with greater happiness, while spending much time on the internet goes with less. The observed negative correlations between internet use and happiness often involve excessive internet usage. People who spend (too) much time on the internet, make excessive use of social media or check their email very often show a negative relationship with happiness. This use of the internet can also lead to lower self-esteem, addiction or a general feeling of wasting time.

Young people especially and people with low levels of subjective well-being are at risk of excessive internet usage which can lower their life satisfaction. People

who are socially disconnected and lonely also show a negative relationship. This could turn into a negative vicious circle and turn into problematic internet use (PIU) or Internet Addiction Disorder (IAD). Social media can reinforce this effect because it encourages people to share positive stories. Using Social media is beneficial to people with high levels of well-being, who can exhibit their happy lives, but it can be harmful to people with low levels of well-being because they might feel envious when they are confronted with this exposure of happiness and they might experience pressure to exhibit inauthentic behaviour, by pretending to be happy while they are not.

In general, one could say that the internet has a positive influence on happiness for people who use it wisely and moderately. It can help to build and sustain social connections and it can improve job opportunities. The elderly (65+) especially profit from internet usage. When they have internet access they can stay connected to the rest of the world, even if they lose their mobility.

5.2 Limitations

This research synthesis limits to happiness defined as the subjective enjoyment of one's life as a whole and measure that matter adequately. This conceptual focus has a price, we came to know more about less. The available research findings do not allow a traditional meta-analysis, both because of the limited numbers and their heterogeneity. Hence, we cannot yet compute effect sizes or test statistical significance of differences.

5.3 Tracking of future research

The available research findings allowed only preliminary answers to the research questions we raised in section 1.1. Research interest is growing and we expect that the evidence base will triple in a few years. The new findings should then be entered in the World Database of Happiness, in addition to these we entered for the purpose of this first research synthesis. Progress reports on this can use the format presented here. Such periodical updates following well-defined concepts and using a standard format will allow more accumulation of knowledge than the current practice of incidental review studies. The stakeholders mentioned in the introductory section need to invest in this systematic collection of research findings on the impact of the internet on human happiness.

6 CONCLUSIONS

One can conclude that the internet can be a blessing or a curse depending on how it is used and who is using it. Most elements of the internet are positively related to happiness, but spending too much time on the internet is often negatively related to happiness. Youngster, lonely people and people with low levels of self-esteem are at risk of problematic internet use (PIU). Social media, used most intensely by young people, adds to this risk because it makes happy people happier and unhappy people unhappier.

When the internet is used moderately and wisely it is positively related to happiness. The elderly especially (65+) seem to profit from using the internet. It is too early to draw firm conclusions, because in most of the studies the correlations were weak and only a few studies examined the chain of causality. Given the growing importance of the internet in our work and our daily lives we think that it would be advisable, to investigate further the relationship between use of the internet and happiness.

REFERENCES

Studies included in this research synthesis are mentioned in table 1.

Arampatzi et al. (2018): study NL 2012. Social Network Sites, Individual Social Capital and Happiness. *Journal of Happiness Studies,* 2018, Vol. 19, 99 - 122

BCS (2010), The Information Dividend: Can IT Make you ''Happier''. *Research Report by Trajectory Partnership i.o.o. BCS the Chartered Institute for IT*, 2010, London, UK

Böhnke & Kohler (2008), Well-Being and Inequality. *WZB Discussion Paper* no. SP I 2008-201, 2008, Berlin, Germany

Brkljacic et al. (2018), I'm Always Online: Well-Being and Main Sources of Life Dis/Satisfaction of Heavy Internet Users. Bahadir Bozoglan, "Psychological, Social and Cultural Aspects of Internet Addiction", 2018, *IGI Global*, Hershey PA, USA, 72 – 88.

Bruni, L. & Porta, P.L (2005). *Economics and Happiness.* Oxford University Press, UK.

Castellacci & Schwabe (2018), Internet Use and the U-shaped Relationship Between Age and Well-being. Working Paper, 2018, Nr. 0215, TIK Centre, University of Oslo, Norway

Diener, E., Emmons, R.A., Griffin, S. & Larsen, R.J. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49: 71 – 75

Duimel (2017). Tieners en Geluk: Liever een Leven Online dan een Gezinsleven? (Teenage Happiness: Link with Familylife and Life On-Line.) *In Schnabel, P.; Ed.: "Veel Geluk in 2007", Social Cultural Planning Office*, 2007, The Hague, Netherlands, 130 - 135

Gurin, G., Feld, S. & Veroff, J (1960). *Americans View their Mental Health. A Nationwide Interview Survey.* Basic Books, New York, USA (Reprint in 1980, Arno Press, New York, USA)

Inoguchi & Fujii (2013), *The Quality of Life in Asia. A Comparison of Quality of Life in Asia*, Springer, 2013, Dordrecht, Netherlands.

Kainulainen, S, Saari, J. & Veenhoven, R (2018*). Life-satisfaction is more a matter of how well you feel, than of having what you want International Journal of Happiness and Development,* 4 (3) 209-235

Krasnova et al. (2013), Envy on Facebook: A Hidden Threat to Users' Life Satisfaction?, *Paper for 11th International Conference on Wirtschaftsinformatik*, 27th February - 01st March 2013, 1 - 17 Leipzig, Germany.

Kross et al. (2013). Facebook Use Predicts Declines in Subjective Well-Being in Young Adults. *Open Access*, 2013, Plos One, Vol. 8, 1 – 7

Lachmann et al (2016). Life Satisfaction and Problematic Internet Use: Evidence for Gender Specific Effects. *Psychiatry Research*, 2016, Vol. 238, 363 – 367

Lannotti et al. (2009). Interrelationships of Adolescent Physical Activity, Screen-based Sedentarry Behavior and Social and Psychological Health. *International Journal of Public Health*, 2009, Vol. 54, 191 - 198

Lee et al. (2011b). Use of Social-Networking Sites and Subjective Well-Being: A Study in South Korea. *Cyberpsychology, Behavior and Social Networking*, 2011, Vol.14, 151 - 159

Lelkes (2012), Happier and Less Isolated: Internet Use in Old Age. *MPRA Paper no. 42546*, 2012, Germany.

Lissitsa & Chachashvili-Bolotin (2016). Life Satisfaction in the Internet Age - Changes in the Past Decade. *Computers in Human Behavior*, 2016, Vol. 54, 197 - 206

Lohmann (2013). Information Technologies and Subjective Well-Being: Does the Internet Raise Material Aspirations? *Discussion Papers, Center for European Governance and Economic Development Research*, 2013, No. 169, Goettingen, Germany

Lyubomirski, S. & Lepper, H.S. (1999). A Measure of Subjective Happiness: Preliminary Reliability and Construct Validation. *Social Indicators Research*, 46, 137 – 155

Lyubomirsky, S., Diener, E. & King, L.A. (2005). The Benefits of Frequent Positive Affect: Does Happiness Lead to Success? *Psychological Bulletin,* 131: 803 – 855.

Neugarten, B.L., Havighurst, R.J. & Tobin, S. S (1961). The Measurement of Life Satisfaction. *Journal of Gerontology*, 16: 134 -143.

Nie et al. (2015): study CN 2010. Internet Use and Subjective Well-Being in China. *Hohenheim Discussion Papers*, 2015, 07-2015, 1 – 48.

OECD (2019). How's Life in the Digital Age? Opportunities and Risks of the Digital Transformation for People's Well-being. *OECD Publishing*, Paris, France

Oh et al. (2004), How Does Online Social Networking Enhance Life Satisfaction? The Relationships among Online Supportive Interaction, Affect, Perceived Social Support, Sense of Community, and Life Satisfaction, *Computers in Human Behavior*, 2014, Vol. 30, 69 – 78

Oosterhof (2008). Maakt Vrije Tijd Gelukkig? De Invloed van Vrije Tijd op Geluksbeleving van Nederlanders. (Does Leisure Time make You Happy? The Influence of Leisure Time on the Happiness Experience of the Dutch). *Master Thesis, Faculty Social Sciences, Erasmus University Rotterdam*, 2008, Netherlands

Orben et al. (2019). Social Media's Enduring Effect on Adolescent Life Satisfaction. *PNAS*, 2019, Vol. 116, 10226-10228

Pénard et al. (2011): study LU 2008. Does the Internet make People Happier? *Journal of Economics*, 2013, Vol. 46, 105 – 116.

Pierewan & Tampubolon (2014a). Internet Use and Well-Being Before and During the Crisis in Europe. *Social Indicators Research*, 2014, Vol. 119, 647 – 66.

Rae & Longborg (2015). Do Motivations for Using Facebook Moderate the Association between Facebook Use and Psychologica Well-Being. *Frontiers in Psychology*, 2015, online, 1 - 9

Reinecke, & Trepte (2014). Authenticity and Well-being on Social Network Sites: A Two-Wave Longitudinal Study on the Effects of Online Authenticity and the Positivity Bias in SNS Communication. *Computers in Human Behavior*, 2014, Vol. 30, 95 - 102

Robinson & Martin (2008), What Do Happy People Do? *Social Indicators Research*, 2008, Vol. 89, 565 – 571.

Rotondi (2016). Connecting Alone: Smartphone Use, Quality of Social Interactions and Well-Being.
Working Paper: Politecno di Milano and University of Milan Bicocca, Department of Management, Economics and Industrial Engineering (DIG), 2016, Italy

Sabatini (2008). Can a Click buy a Little Happiness? The Impact of Business-to-Consumer E-Commerce on Subjective Well-Being. *MPRA Paper* no. 32393, 2011, München, Germany

Senol-Durak & Durak (2010). The Mediator Roles of Life Satisfaction and Self-Esteem between the Affective Components of Psychological Well-Being and the Cognitive Symptoms of Problematic Internet Use. *Social Indicators Research*, 2011, Vol. 103, 23 - 32

Shu & Zhu (2006. The Quality of Life in China. *Social Indicators Research*, 2009, Vol. 92, 191 - 225

Steyaert (2009). De Invloed van Online en Ofline Sociale Relaties op ons Leefritme en Geluk. (The Impact of Online and Offline Social Relations on Liferhythm and Happiness.). *Leefritme Kennis Centrum*, 2009, Netherlands

Tambyay et al. (2009). The Quality of Life in Singapore. *Social Indicators Research*, 2009, Vol. 92, 337 – 376

Veenhoven, R. (1984). *Conditions of happiness.* Reidel (now Springer), Dordrecht, Netherlands.

Veenhoven, R. (2000). The four qualities of life. Ordering concepts and measures of the good life. *Journal of Happiness Studies*, 1: 1-39

Veenhoven, R. (2008). Healthy happiness: Effects of happiness on physical health and the consequences for preventive health care. *Journal of Happiness Studies*, 9: 449-464

Veenhoven, R. (2017). Co-development of Happiness Research: Addition to "Fifty Years After the Social Indicator Movement. *Social Indicators Research*, 135: 1001-1007

Veenhoven, R. (2019a) *World Database of Happiness: Archive of research findings on subjective enjoyment of life.* Erasmus University Rotterdam, The Netherlands

Veenhoven, R. (2019b). *Measures of Happiness.* World Database of Happiness, Erasmus University Rotterdam

Veenhoven, R. (2019c). *Bibliography of Happiness.* World Database of Happiness, Erasmus University Rotterdam

Veenhoven, R. (2019d). *Correlates of Happiness.* World Database of Happiness, Erasmus University Rotterdam

Veenhoven, R. (2019e). *Findings on Happiness and Nutrition.* World Database of Happiness, Erasmus University Rotterdam

Veenhoven, R. (2019f). *World Database of Happiness: A 'findings archive'* . Chapter in Handbook of Wellbeing, Happiness and the Environment. Editors: Heinz Welsch, David Maddison and Katrin Rehdanz, Edward Elgar Publishing (forthcoming)

Weinstein et al (2014). Behavioral addictions; criteria, evidence and treatment. Chapter 5, Internet Addiction Disorder. *Academic press*.

White et al. (1999). Surfing the Net in Later Life: A Review of the Literature and Pilot Study of Computer Use and Quality of Life. *The Journal of Applied Gerontology*, 1999, Vol. 18, 358 - 378

Wilczek (2018): study ZZ Europe 2010. Media use and life satisfaction: the moderating role of social events. *International Review of Economics*, 2018, Vol. 65, 157 – 184

Yoo et al. (2014). Associations between Overuse of the Internet and Mental Health in Adolescents.
Nursing and Health Sciences, 2014, Vol. 16, 193 - 200

Figure 1

Start page of the World Database of Happiness, showing the structure of this findings archive

Figure 2

Example of an online findings page

Correlational finding on Happiness and Time on Internet. Subject code: I04ab03a

Study	Iannotti et al. (2009): study ZZ Developed nations 2008
Title	Interrelationships of Adolescent Physical Activity, Screen-based Sedentarry Behaviour and Social and Psychological Health.
Source	International Journal of Public Health, 2009, Vol. 54, 191 - 198
DOI	DOI:10.1007/s00038-009-5410-z
Public	11, 13 and 15 aged, 41 nations, 2008-2009
Sample	Probability cluster sample
Non-Response	
Respondents N =	204534

Correlate

Author's label	Screen-based media use
Page in Source	191,192,195
Our classification	Time on internet, code I04ab03a
Operationalization	Self report of hours spend per day on: A: Using a computer during free time (excluding time spent doing homework) B: Watching television (including videos) Computation: average hours per day on A and B

Observed Relation with Happiness

Happiness Measure	*Statistics*	*Elaboration/Remarks*
C-BW-c-sq-l-10-b	r=-.09 p < .0001	North America
C-BW-c-sq-l-10-b	r=-.03 p < .01	Western Europe
C-BW-c-sq-l-10-b	r= ns	Eastern Europe
C-BW-c-sq-l-10-b	r=-.09 p < .0001	Northern Europe
C-BW-c-sq-l-10-b	r=-.06 p < .0001	Southern Europe
C-BW-c-sq-l-10-b	r= p < .0001	North America < Western Europe < Eastern Europe

Table 1:
Studies in which the relationship between internet use and happiness was examined.

People, Place, Time, N	Measure of Internet Use	Measure of Happiness	Source[6]
General public			
General public, Italy, 2008, N=4130	Online shopping	Life satisfaction	Sabatini (2011)
Internet users, Michigan, USA, 2014 N=339	Social Media Use	Life satisfaction	Oh et al. (2014)
Visitors of a 'digital society' exhibition, Germany and Austria, 2016, N=4852	Internet addiction	Life satisfaction	Lachmann et al. (2016)
20+ aged general pubic, Israel, 2003-2012, N=73523	Internet use Computer use	Life satisfaction	Lissitsa & Chachashvili-Bolotin (2016)
20+ aged, general public, Singapore, 2006, N=1038	Time spend on internet	Happiness	Tambyah et al. (2009)
18+ aged, general public, Italy, 2016, N=144809	Internet use	Life satisfaction	Rotondi et al. (2016)
18+ aged, general public, USA, 1972-2006, N=5005	Time spend on internet	Happiness	Robinson & Martin (2008)
18+ aged, general public, Luxemburg, 2008, N=1332	Internet use	Life satisfaction	Pénard et al. (2011)
18+ aged, general public, 57 nations, 2004-2009 N=53325	Internet use	Life satisfaction	Lohmann (2013): study ZZ 2005
18+ aged, general public, EU 27 and Turkey, 2003, N=18600	Internet use	Life satisfaction	Böhnke & Kohler (2008)
18+ aged, general public, World, 2005, N=35000	Internet access	Life satisfaction	BCS (2010)
15+ aged general public, EU nations, 2004-2010, N=150.000	Internet access Internet use	Happiness	Pierewan & Tampubolon (2014a)
General public, aged 15+, The Netherlands, N=1286	Time on internet	Happiness	Steyaert (2009)

[6] Links in this column lead to full bibliographical. detail in the list of references, from where another link leads to an online excerpt of this study

15+ aged, general public, Europe 2010-2015, N=73860	Internet use	Life satisfaction	Wilczek (2018)
15+ aged, general public, 27 EU nations, 2010-2013, N=100.000	Internet use	Life satisfaction	Castellacci & Schwabe (2018)
15+ aged, general public, Europe, 2013, N=82.000	Internet access	Life satisfaction	OECD (2019)
12+ aged, general public, The Netherlands, 2005 N=2204	Internet use Computer use	Happiness	Oosterhof (2008)
Social Media Users			
Facebook users, Ann Arbor, Michigan, followed 14 days, USA, 2013, N=82	Social Media Use	Positive and negative affect	Kross et al. (2013)
Social media users,, Germany, followed 6 months, 2010-2011 N=374	Social Media profile	Positive and negative affect	Reinecke & Trepte (2014)
Seniors (65+)			
65+ aged, 26 European nations, 2010-2011, N=11.000	Internet use	Happiness Life satisfaction	Lelkes (2012)
65+ aged, residents of a retirement community, USA, 1999 N=23	Internet use Computer use	Positive and negative affect	White et al. (1999)
Adults (incl young adults & sometimes incl. adolescents)			
15-44 aged, internet users, The Netherlands, 2012-2013, N=1944	Online gaming, Social Media Use	Happiness	Arampatzi et al. (2018)
16-60 aged, internet users, China, 2010, N=4686	Time on internet	Happiness Life satisfaction	Nie et al. (2015)
Working aged (20-69), China, 2003-2008, N=1798	Internet use	Happiness Life satisfaction	Inoguchi & Fujii (2013)
20-69 aged, general public, China, 2006, N=2000	Time on internet	Happiness Life satisfaction	Shu & Zhu (2009): study CN 2006
Young adults			
17-36 aged, students, Turkey, 2010, N=521	Attitude towards own internet use	Positive and negative affect	Senol-Durak & Durak (2010)
18+ aged undergraduate students, Facebook users, Seattle, USA, 2014, N=119	Number of Facebook friends	Life satisfaction	Rae & Lonborg (2015)

18+ aged, students, Berlin, Germany, N=227	Social Media Use	Happiness Life satisfaction	Krasnova et al. (2013)
18-32 aged, students, Zagreb, Croatia, N=500	Frequency of internet use	Happiness Life satisfaction	Brkljacic et al. (2018)
University students, South Korea, 2011, N=217	Social Media Use	Positive and negative affect	Lee et al. (2011b)
Adolescents			
12-19 aged, middle and high-school students, South Korea, 2011, N=73238	Internet addiction	Happiness	Yoo et al. (2014)
11, 13 and 15 aged, 41 nations, 2008-2009, N=204534	Internet use	Life satisfaction	Iannotti et al. (2009)
12-15 aged, UK, folowed 7 years 2009-2016 N=1699	Social Media Use	Life satisfaction	Orben et al. (2019)
Teenagers, Netherlands, 200?, N=1561	Time on internet	Satisfaction with quality of life	Duimel (2007)

Table 2

Overview of observed correlation between aspects of internet and happiness

ASPECTS	**RESEARCH METHODS**					
	Cross−sectional		**Longitudinal**		**Experimental**	
	Zero−order	*Partial*	*Zero−order*	*Partial*	*Zero−order*	*Partial*
Access to internet						
Internet penetration in environment		**+ +**				
Personal access		**+**				
Ability to use internet					+	
Use of internet (vs not)	**+**	**+ + + + + −y−y+y+ +**				
Time on internet	**− − − − − − − 0** − **−h−** − 0 0	− -s**+ + +** +y+y**−y−** − −h+/-p+ −h**−** − −c**−** −c**−** + −h**−**h+ −p**−**p+/- −h−h0h+ +h+ +p+ −s+ − −p−		− **−** **−**		
Usages of internet						
Buying		**+**				
E-mail		**+**s− −p−				
Gaming		0				
Information seeking		− **+** −h+/−				
Social media	− − 0 **−** − −s+ +	**+**s− **+** −c**−** 0 − − −p**+**		− **−** **−**		
Behaviour on internet						

- Authenticity	+	+	+	+		
Attitudes to internet						
Attitudes to internet as such						
Attitudes to own internet behaviour						
- Perceived internet addiction	−p− −p−					
Attitude to own social network						
- Feels connected	+	+				
- Feels envy		−				
- Trust in social network	+					
- Perceived support	+					
Perceived number of close network friends	+					

Signs explained on appendix A. Signs link to finding page in World Database of Happiness. Use control+click to view the page.

Table 2a

Overview of observed correlation between aspects of internet and happiness per age group

Age group indicated using colors

ASPECTS	RESEARCH METHODS					
	Cross−sectional		Longitudinal		Experimental	
	Zero−order	*Partial*	*Zero−order*	*Partial*	*Zero−order*	*Partial*
Access to internet						
Internet penetration in environment		+ +				
Personal access		+				
Ability to use internet					+	
Use of internet (vs not)	+	+ + + + + −y−y+y+ +				
Time on internet	− − − − − − − 0 − −h− − 0 0	− -s+ + + +y+y−y− − −h+/-p+ −h− − −c− −c− + −h−h+ −p−p+ −h−h0h+ +h+ +p+ −s+ − −p−		− − −		
Usages of internet						
Buying		+				
E-mail		+s− −p−				
Gaming		0				
Information seeking		− + −h+				
Social media	− − 0 − − −s+ +	+s− + −c− 0 − − −p+		− − −		
Behaviour on internet						
- Authenticity	+	+	+	+		
Attitudes to internet						
Attitudes to internet as such						

Attitudes to own internet behaviour						
- Perceived internet addiction	−p− −p−					
Attitude to own social network						
- Feels connected	+	+				
- Feels envy		−				
- Trust in social network	+					
- Perceived support	+					
Perceived number of close network friends	+					

Colors of signs denote age group measured

- General public
- Seniors (65+)
- Adults
- Young adults
- Adolescent

Table 2b

Overview of observed correlation between aspects of internet and happiness

Happiness variant indicated using colors

ASPECTS	RESEARCH METHODS					
	Cross−sectional		Longitudinal		Experimental	
	Zero−order	Partial	Zero−order	Partial	Zero−order	Partial
Access to internet						
Internet penetration in environment		+ +				
Personal access		+				
Ability to use internet					+	
Use of internet (vs not)	+	+ + + + + −y−y+y+ +				
Time on internet	− − − − − − − − 0 − −h− − 0 0	− -s+ + + +y+y−y− − −h+/-p+ −h− − −c− −c− + −h−h+ −p−p+/- −h−h0h+ +h+ +p+ −s+ − −p−		− − −		
Usages of internet						
Buying		+				
E-mail		+s− −p−				
Gaming		0				
Information seeking		− + −h+/−				
Social media	− − 0 − − −s+ +	+s− + −c− 0 − − −p+		− − −		
Behaviour on internet						
- Authenticity	+	+	+	+		

Attitudes to internet						
Attitudes to internet as such						
Attitudes to own internet behaviour						
- Perceived internet addiction	−p− −p−					
Attitude to own social network						
- Feels connected	+	+				
- Feels envy		−				
- Trust in social network	+					
- Perceived support	+					
Perceived number of close network friends	+					

Signs explained on appendix A. Signs link to finding page in World Database of Happiness. Use control+click to view the page.

Colors of signs denote kind of happiness measured

- **Overall happiness:** life satisfaction
- **Affective component:** hedonic level of affect
- **Cognitive component:** contentment
- **Mixed measure**
-

Table 3:
Ratio of positive and negative correlations observed between happiness and aspects of internet use
As observed in 34 empirical studies

	Positive	Positive	Negative	Negative	Neutral	Total	Ratio pos/neg	Ratio pos/neg.
	significant	not significant	significant	not significant				significant double
Internet penetration	2					2		
Personal access	1					1		
Ability to use internet		1				1		
Use of internet	8					8		
Time on internet (35)	3	13	15	24	4	59	0,41	0,35
Buying	1					1		
Email	1			3		4	0,33	0,67
Gaming					1	1		
Information seeking	1	1		3		5	0,67	1,00
Social Media	3	2	4	10	2	21	0,36	0,44
Authenticity	4					4		
Perceived internet addiction				4		4		
Feels connected	2					2		
Feels envy			1			1		
Trust in social network	1					1		
Perceived support		1				1		
Perceived number of close friends		1				1		
Total	27	19	20	44	7	**117**		
Total pos & neg		46		64		110		
Ratio pos/neg		0,72						
Ratio pos/neg significant		1,35						
Ratio pos/neg significant double		0,87						

Appendix

Meaning of signs used in tables

+ = positive correlation, significant

\+ = positive correlation, not significant

0 = direction of correlation not reported and not significant

− = negative correlation, significant

− = negative correlation, not significant

++ = positive correlations with two different measures of happiness

−c+ = positive and negative correlations obtained with different sets of **c**ontrol variables

−s+ = positive and negative correlations obtained with different **s**tatistics

−y+ = positive and negative correlations obtained in different **y**ears

−p+ = positive and negative correlations obtained in different **p**opulations

−h+ = positive and negative correlations obtained in different **h**appiness measures

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