

Methods Article

ONLINE 'FINDINGS-ARCHIVE': A NEW TOOL FOR RESEARCH SYNTHESIS

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ABSTRACT

Social scientists are producing an ever-growing stream of research findings, which is increasingly difficult to oversee. As a result, capitalization on earlier investment is declining and accumulation of knowledge stagnating. This situation calls for more research synthesis and interest in techniques to produce these syntheses is on the rise. Attention has been focused on statistical techniques for meta-analysis, with little attention paid to the preliminary step of gathering the available research findings together. What is needed is 1) a technique for describing research findings in a comparable way, 2) a system for storing such descriptions in an online archive, 3) to which research findings can be added on a continuous basis, and 4) that can serve as a virtual appendix for review papers. These demands are met by the World Database of Happiness, which is tailored to facilitate the assembling of research findings on happiness. With its focus on 'findings' the system differs from data-archives designed to store 'investigations' and from bibliographies that store 'publications'. As yet there is no established term used to describe this research synthesis tool. We call it a 'findings archive'. In this paper we explain how the technique works and show how an on-line findings-archive can be used in review papers. We note how the technique can be applied on subjects other than happiness.

Keywords: literature review, review technique, research synthesis, outcome archive, comparative analysis, happiness, life satisfaction, subjective wellbeing, quality of life.

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THE PROBLEM: DATA-DELUGE

The empirical sciences have expanded over the last decades and this has resulted in a growing amount of research findings that are reported in an ever-growing number of publications. The growth is exponential and the yearly number of scientific publications is nearing 2 million (OST 2019). As the stack of research findings swells, it becomes ever more difficult to oversee all the obtained findings. Typically, we find the most recent finding at the top of the pile, coupled with a few familiar salient facts that are brought up over and over again. Many of the fruits of our empirical research sink out of sight and become difficult to retrieve, even for interested specialists. As a result, there is less accumulation of knowledge than the available data should permit and a lot of redundancy in the work that is done. This is a remarkable failure of our present science system.

Research synthesis

One of the ways to deal with this data-deluge is summarizing the findings, which is called 'research synthesis'. Techniques for research synthesis have been developed in the last decades, classic books on research synthesis are Wolf (1993), Light & Pillemer (1984) and a recent update is Cooper (2017). These techniques are now widely applied, in particular statistical meta-analysis. A search in Google Scholar by October 2021 on 'research synthesis' in the title of scientific publications yielded 2,890 hits and a search on 'meta-analysis' some 680,000.

Problems of research synthesis

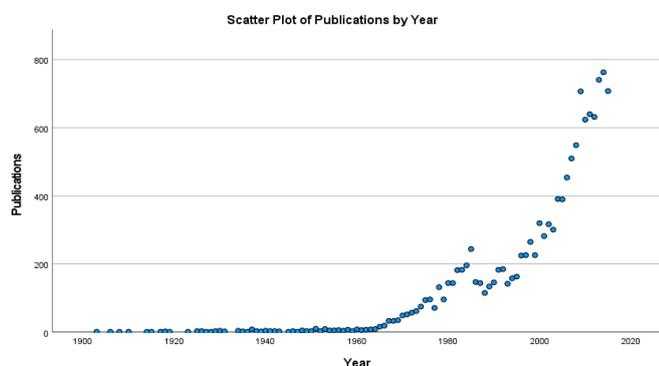
Summarizing research findings sounds an easier task than it is. Several problems arise when using this methodology.

One of the problems sits in the conceptual focus. What precisely should be summarized? Narrative reviewers are often not very precise as is the case in the review of research on 'successful aging' by Martinson & Berridge (2015). Quantitative reviewers are in most cases more specific conceptually but do not always focus on exactly the same, see for example the meta-analyses of research on internet use and 'well-being' by Huang (2010) and Cikrikci (2016), which cover quite different notions of what is being 'well'. A second problem is that research syntheses tend to be selective in a number of ways. Most studies limit to findings reported in scientific journals and this involves various biases, such as underrepresentation of findings on non-differences and neglect of findings that do not fit fashionable theories. Likewise, findings from modern English-speaking nations are typically overrepresented, which limits our view on cultural variation. A related problem is that synthetic studies are mostly incomplete. Their coverage is typically restricted to what one scholar can handle within the restrictions of teaching load and a temporary grant. For instance, it is almost impossible to cover all the research on job-satisfaction. In addition, research money is more easily found for the production of new findings than for the accumulation of past research data. As a result, there is not only little research synthesis being done but also little continuity in that strand. Synthetic studies are typically one-time assessments that soon become outdated. Consequently, research syntheses typically do not build on each other. There is little accumulation of knowledge in the research strand that aims at accumulation. At the same time, it is also difficult to build on earlier synthetic studies because they tend to be rudimentary documented. Review articles have long lists of references, but typically provide little detail about the research findings they summarize. Scientific journals do not provide the room for such detail and book publishers tend not to be enthusiastic about using paper to print all these details for a small readership.

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The case of empirical research on happiness

Over the centuries, the subject of happiness has absorbed a lot of thought. Happiness was a major theme in early Greek philosophy and gained renewed interest in the later West-European Enlightenment. This philosophical tradition has produced a lot of ideas, but little factual knowledge. In fact, philosophers have raised more questions about happiness than they have answered. Most of the controversies they have raised could not be solved by the logic of reasoning, while settlement on the basis of reality checks has long been encumbered by a lack of adequate research tools and techniques. In the 20th century, the social sciences brought a breakthrough. New methods for empirical research made it possible to identify conditions for happiness inductively and even to test hypotheses. This instigated a lot of research, most of which has been embedded in the newly established specializations of 'Social Indicators Research', 'Health-Related-Quality-Of-Life Research', 'Positive Psychology' and 'Happiness Economics'. These strands of research are growing fast. [Chart 1](#) shows the rising number of scientific publications on happiness. This multitude of about 12.000 publications with some 800 new papers each year is too much to oversee, even for specialists. Consequently, several scholars have tried to summarize the available findings. Reviews of this research literature have been published by Veenhoven (1984), Argyle (1987), Diener (1999) and Dolan *et. al.*, (2006). To date (1-10- 2021), the Bibliography of Happiness contains 239 review studies on happiness, which are listed [here](#). The problems of research synthesis, mentioned above in section 1.2, appear also in this case of happiness. The concept is not always clearly defined, the coverage of the available findings is selective and incomplete, documentation is mostly poor and the reviews do not build on each other. These shortfalls got worse with the rising number of empirical studies on happiness.



Source: Bibliography of happiness (Veenhoven 2021b).
Only publications that deal with happiness as life-satisfaction

Chart 1. Rise of scientific publications on happiness

A SOLUTION: 'FINDINGS-ARCHIVE'

Research synthesis is a viable way to deal with the data-deluge and many of the limitations of research-synthesis, discussed in section 1.2, can be overcome using a 'findings-archive'. We developed this technique for storing research on happiness and preparation for synthetic analysis of these, but the tool can also be used for organizing research findings on other subjects. Below we describe the technique, using its application on happiness research as illustration.

What it is

A 'findings-archive' is a collection of empirical research findings on a particular phenomenon, in the case at hand here 'happiness'. These findings are described in a standard format and terminology on electronic finding-pages, which can be sorted in various ways, such

as on subject (e.g., relation with income), population (e.g., poor countries), and method (e.g., experimental study). These finding-pages are made available on a website to which hyperlinks can be made in review papers.

Building blocks

Finding-pages are organized in collections, from which reports are generated. Reports are bundles of finding-pages on a particular subject. This organizational structure is presented in [Chart 2](#). These three elements are described in the next sections.

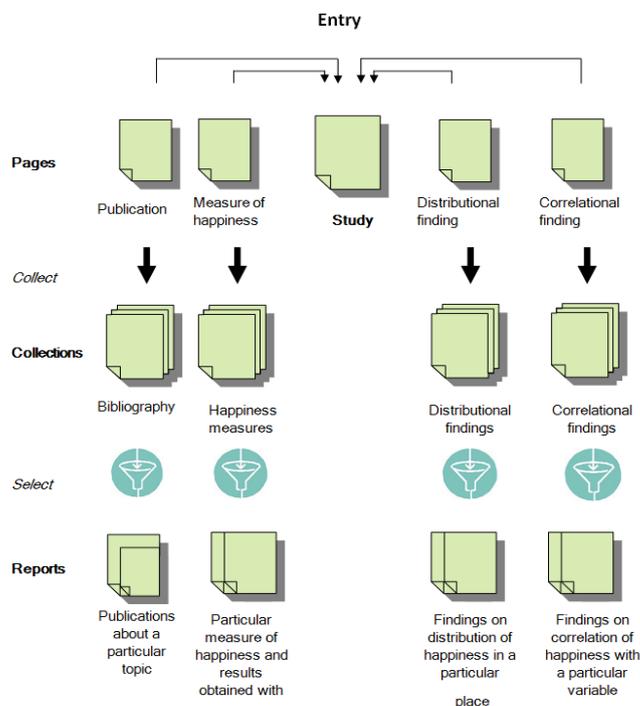


Chart 2. Building blocks of the findings-archive

Finding-pages

At the heart of the archive are finding-pages consisting of a standardized summary of a particular quantitative research observation. Two kinds of findings are involved: a) 'distributional findings', that is, observations on the spreading of the focus variable (happiness) in a particular population, and b) 'correlational findings' about the degree to which other things than the focus variable go together with it.

Distributional finding-page

A page of this kind describes how the focus variable (happiness) is distributed in a particular population, as observed using a particular measure of that variable. Next to the frequency distribution, the page reports two summary statistics: the mean and the standard deviation. Information about the people under investigation is taken from a 'study page', information on the measure of happiness is taken from a 'measure page' and information on the original research report from a 'publication page'. An example of such a page on a distributional finding can be found [here](#).

Correlation finding-page

This kind of page contains the description of the observed statistical associations between the focus variable (happiness) and something else, called a 'correlate', in a particular public and using a particular measure of happiness. The page is partly built from the pages on a particular 'publication', 'study' and 'happiness measure'. Additional elements are description of the correlate and the observed statistical association. The description of the correlate consists of three parts: 1)

the name by which the correlate is called in the original research report, 2) the name we assigned using our classification of correlational subjects and 3) detail about the measurement of the correlate. Our subject classification is made on the basis of what is actually measured and disregards theoretical meanings imputed by the original investigator. Detail about the subject classification of correlates is found [here](#). Description of the observed statistical association of the correlate with focus variable (happiness) involves the following elements: the statistics used for quantifying the degree of association and for assessing statistical significance, the values obtained in the study and particular elaborations or specifications. An example of a page with a correlational finding can be found [here](#).

Accompanying pages

The above discussed 'finding-pages' draw on accompanying pages on 1) a particular publication, 2) a particular study and, 3) a particular measure of happiness. The pages also use a standard format and a standard vocabulary.

Pages on a particular publication. Pages of this kind are much like an old-fashioned catalog card in a library. They enumerate author, title and bibliographical source. Unlike the traditional library card, pages also contain a link to the full text. As in a systematic library catalog, publication pages also mention the subjects addressed in the publication, using a classification of topics in the field. In the case where a publication deals with an empirical study the results of which are entered in a findings collection, the page also gives a link to the excerpt of that study. An example of a publication page can be found [here](#).

Pages on a particular empirical study. If a publication reports an empirical investigation that used an acceptable measure of the core variable (happiness), that investigation is described briefly on a 'study page'. Standard descriptive are: the population under investigation (i.e., public, place, and time), sampling, response rate, number of participants (N) and method of observation, such as face-to-face interview or web questionnaire. On each study page is a reference to the publication from which the information is drawn, when possible, with a link to the full text. Study pages also have links to the pages discussed below regarding the 'measure of happiness' used and the observed 'distributional' and 'correlational' findings. An example of a study page is found [here](#).

Pages on a particular measure. Pages of this kind describe a particular way of measurement of the focus variable, which, in this case happiness, is mostly a survey question. Such pages present a detailed description of the measure, in this case of happiness the full text of the question and related answer categories. These measure-pages also have links to all the studies in which this particular measure was used and to the findings obtained with that measure in each of these studies. An example of such a measure page can be found [here](#).

Collections

The above-mentioned finding-pages are gathered in collections. The World Database of Happiness has five such collections: 1) the Bibliography of Happiness, 2) Directory of Happiness Investigators, 3) the collection of 'Measures of Happiness', 4) the collection of 'Distributional Findings' and 5) the collection of 'Correlational Findings'. The way in which these collections are linked is depicted in the flowchart on the start page of the website, a screenshot of which is presented in [Chart 3](#).

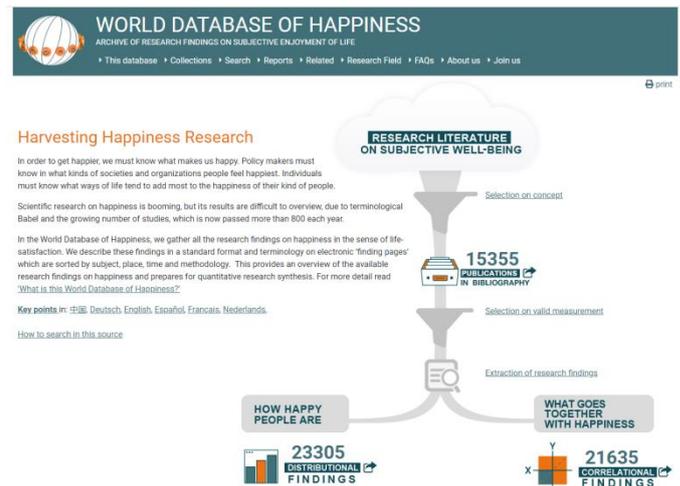


Chart 3. Start page of the website of the World Database of Happiness

Bibliography of Happiness

All publications on happiness that passed a selection on conceptual fit are entered in the '[Bibliography of Happiness](#)' (Veenhoven 2021b). This involves the making of a 'publication page' (as described above), the bibliography being a collection of such pages. The Bibliography of Happiness contains a detailed systematic subject index, which allows an easy overview of the field and helps the user to track literature on specific issues. An example of a selection on a subject matter is given [here](#) and the full subject classification is discussed [here](#). Publications can also be searched on author, key words, place, time and medium of publication and on words used in the title. Search terms can be used in combination.

Directory of Happiness Investigators

Authors of publications that are entered in the Bibliography of Happiness are automatically listed in the '[Directory of Happiness Investigators](#)' (Veenhoven 2021c). To date, the directory contains some 15000 names for which about half have an e-mail address. Addresses are limited to investigators who have published after 1975. The directory is fairly complete up to 2019. Since the directory is linked to the bibliography, which is indexed by subject, one can easily select specialists on a particular topic within happiness research and because the bibliography is also indexed by year of publication, one can identify currently most active researchers per subject. Authors can also be selected on the country where they live. The directory is available on request to peer researchers, for scientific purposes only. In the last few years, it has been of great help in creating research networks on and around the theme of happiness, to be discussed below.

Collection of Happiness Measures

All measures of happiness used in empirical studies are checked for fit with the concept of happiness used here (to be discussed below). The selection is quite stringent and about half of the indicators claimed to measure happiness is rejected. This restrictiveness has a price: the results of many otherwise good studies are not included in the findings collections. The gain is that we can be sure about what the selected findings mean. Accepted measures of happiness are described on a measure-page, which enumerates the full text of questions or observation schedules and contains links to studies in which these measures have been applied. Together, these pages constitute the collection '[Measures of Happiness](#)', (Veenhoven 2021d) which entails a detailed classification of happiness measures, based on distinctions between happiness-variants, time reference and methods of assessment. Detail about this classification is found [here](#). The measure-pages link to the studies that used this particular measure of happiness, and thereby the collection provides an easy

overview of the scores yielded using the same measures in different populations. The collection is therefore useful for selecting happiness measures that allow comparison with earlier research. It is also a valuable tool for identifying instrument effects.

Collections of Distributional Findings on Happiness

Distributional findings are about how happy people are in a particular population. As indicated above, each of such findings is noted on a separate finding-page. These finding-pages provide detail about sampling and interrogation and present the full frequency distribution of responses, together with mean and standard deviation. Comparison is facilitated by additional transformation of means and standard deviations to a common 0 to 10 numerical scale and by presenting the 95% confidence interval around these central tendency statistics. These pages are sorted in 'collections', such as happiness in places (nations, regions, cities) and happiness in particular publics, such as happiness in elderly people (Veenhoven 2021e).

Collection of Correlation Findings

The World Database of Happiness also provides a large collection of [Correlational Findings](#) (Veenhoven 2021f). As noted above, research findings are condensed into standard abstracts, which are presented on *finding-pages*. To date (1-10-2021), there are about 22.000 such finding-pages in the collection, taken from some 2.500 studies. Pages on correlational findings are ordered by the kind of correlate involved. For instance, there are 959 pages about findings on the relation between happiness and 'age'. The subject classification used is fine grained and involves some 3.000 categories. Though complicated at first sight, this detailed classification is helpful for tracing atypical findings that would otherwise fall out of sight in this expanding field. The subject classification is explained [here](#). The collection can also be searched in several more ways, such as on happiness measure, public, nation and time. Something that is particularly useful for identifying causality is that the search mechanism of the findings-archive allows longitudinal and experimental studies to be selected.

Reports

Selections of finding-pages can also be presented in 'reports', that is, selections of information about happiness presented in an easy to overview way. Reports can be downloaded as a file and printed on paper. They can be cited as separate publications. The World Database of Happiness generates several reports on happiness in nations. Selections of all the findings on happiness in a particular nation are presented in 'nation reports', such as the report on [Happiness in France](#). There are also automatically generated reports on [Rank of Happiness in Nations](#) and reports on the [Trend of Happiness in Nations](#) over the years.

Inclusion criteria

A findings-archive gathers research results on a particular topic and that topic can be broad or narrow. Since a findings-archive is normally prepared to support a quantitative research synthesis, a narrow definition of the topic is typically required to avoid adding apples and oranges. Wide-ranging themes are better fitted to narrative literature reviews. In the case of the World Database of Happiness, a strict definition of happiness is used. Happiness is defined as the subjective appreciation of one's own life as-a-whole, in short, as life-satisfaction. More detail about this definition can be found [here](#). The Bibliography limits to scientific publications on this subject, even if it is called by other names. Hence, selection for inclusion in the Bibliography requires close-reading of publications. Inclusion in the collections of research findings furthermore requires that happiness

has been measured adequately. This entails a test for 'face validity', which involves close reading of the questions and subsequent comparison with the definition of happiness. This selection process is explained in more detail [here](#) and it is this conceptual selectiveness that means that the World Database of Happiness should be characterized as a focused findings-archive.

Website

Findings are entered in an MS Access application and after double check uploaded to a website, the address of which is <https://worlddatabaseofhappiness.eur.nl>. This site is free accessible.

Platform for cooperation

Although originally developed as a stand-alone project at the Erasmus University Rotterdam in the Netherlands, the World Database of Happiness has developed into an international documentation center for empirical happiness research, to which scholars all over the world can add. Colleagues can join the project as a research-associate. They can then enter their own findings and/or take responsibility for keeping a part of the archive up-to-date, such as by entering all the findings on happiness gathered on a particular subject or in a particular country. More detail about the role of associated researchers is found [here](#). As such, a findings-archive can serve more functions than just storing research findings.

USES OF A FINDINGS-ARCHIVE FOR RESEARCH-SYNTHESIS

The main function of a findings-archive is to allow *continuous accumulation of knowledge* on a particular subject, by providing a structure to which new research results can be added and on which periodical synthetic studies can be done. A findings-archive also facilitates *preparation* for research synthesis and the *presentation* of the results of such studies in review papers.

Building on a continuing collection

Research-syntheses are typically one-time endeavors, limited in size to what one scholar could handle. This may do for a first review of research in a field, but becomes unfeasible when the research output in that field grows. Dealing with the data-deluge (cf. section 1) requires that one can build on earlier work, on earlier collections of research findings, which requires an earlier developed structure to store such findings. If available, researchers working on syntheses can use their time for updating the collection and need not begin from start again.

Preparation for research synthesis

Research-synthesis is about combining results of different studies on a same subject and requires considerable homogeneity in the findings to be synthesized. A findings-archive facilitates the meeting of this requirement in the following ways.

Conceptual focus

Meaningful research synthesis requires a clear theoretical definition of what is to be synthesized, and that the findings considered are measured using indicators that really fit that concept, rather than being called by the same name. Since measures of the same thing may still not be fully identical, a detailed description and classification of measures is required to take such differences into account in later analyses. The WDoH collection 'Measures of Happiness' provides an example of how that can be done as can be seen [here](#).

Standardized description of research findings

There is no unanimity on terminology in academia, especially not in the social sciences, neither for the words used to denote research techniques nor for those to delineate substantive concepts. Comparability requires that all findings are described using the same vocabulary, which on its turn requires that a standard lexicon is defined. The World Database of Happiness provides such a lexicon. A glossary of the technical terms used in the WDoH can be found [here](#) and for statistics [here](#), while a wordlist for substantive concepts is implied in the classification of correlations, which can be found [here](#). Users can find a standard term searching on synonyms (key words) in this [search screen](#).

Homogenization of statistics

Distributional findings are often presented on different scales, in the case of happiness research using verbal, or numerical response scales and scales of different length. This variation in response scales impedes comparison, e.g., if happiness is measured in one country using a choice between very happy, pretty happy and not too happy and in another country using a number between 10 (happy) and 0 (unhappy). Techniques for transforming means to a common numerical 0-10 range have been developed in the context of the World Database of Happiness, a description can be found [here](#). Techniques for the homogenization of correlational findings can be found in introductions to meta-analysis, such as Cooper & Hedges (1994). Computing comparable correlations often requires the use of a frequency table. When available, these are entered in an excel file and used to compute applicable statistics. These statistics are reported in the finding-page and appear on the website, while a copy of the excel sheet is saved in the underlying MS-Access database.

Presentation of results, using links to an on-line finding-pages

Reviews of research typically summarize the main trends in research findings in verbal statements, followed by references to publications in which such findings have been reported. Although the source publications are listed at the end of the paper, they are not easily assembled by a reader and therefore a reviewer's interpretation cannot be easily controlled. Two technical innovations help us to deal with this problem: 1) the online availability of detailed information in a finding archive, 2) the change in mode of scientific publication from paper to electronic files in which hyperlinks can be inserted. Review papers can now be directly linked to particular *finding-pages*. Examples of such presentations are given below in the charts [4](#), [5](#), [6](#), [7](#) and [8](#). This way of summarizing research findings has several advantages over traditional reviews that are limited to the possibilities of printed paper. Checking with the available data is easier as the electronic links provided in the text will lead the reader directly to standardized descriptions of research findings, all of which contain a traditional reference to the original research report. Referencing is also more complete; traditional reviews must often cite selectively, since they cannot mention all the available data in the limited space available for a printed journal article. Use of an online findings-archive allows *all* research findings to be taken into account and thereby avoid the danger of 'cherry picking', an inherent problem of traditional synthetic studies. A findings-archive also allows more complete descriptions of findings. While traditional reviewers typically have to condense information into a few columns of a summary table, the use of a findings-archive allows direct access to much more detail in an online *finding-page*. In short: the findings-archive technique allows reviewers to make controllable statements about main trends in data without burdening the reader with too much detail, since the reader can seek, and easily find, more detail if they wish.

Use in narrative reviews of research

Reviews of the research literature on a topic typically summarize main trends in verbal statements, such as that X was found to be associated with Y in most studies. Reference to one or more publications are used to support such statements. As noted above, such references are often incomplete and cannot be easily checked by the readers of narrative reviews. This is not the case if statements about a trend in research draw on a collection of findings in an online-findings-archive, to which links are made in the text. An example of such referencing using the World Database of Happiness is presented on [Chart 4](#). This reference technique was also applied in Veenhoven (2015).

Chart 4. Typical correlation between individual happiness and aspects of civilization in modern nations as observed in various studies

Aspect of civilization	Correlation with happiness	Section in findings archive
<i>Cultural development (Bildung)</i>		
Learning	+	Current education
Intellect	0	Test intelligence
Cultural consumption	+	Current cultural participation
Reading	+	Reading
<i>Personality</i>		
Conscientious	+	Personality: Conscientiousness
Emphatic	+	Personality: Emphatic
Cooperative	++	Personality: Cooperative, Kind
Self-controlled	+	Personality: (Non)Impulsive
<i>Social behavior</i>		
Aggression	-	Aggressive behavior
Helping	+	Current helping
Volunteering	+	Voluntary work
<i>Values</i>		
Self-development	+	Value preference: Self-actualization
Knowledge	±	Value preference: Education
Sociability	+	Value preference: Social values

Source: Veenhoven 2014, table 1 (adjusted to new WDH website)

Use in quantitative research synthesis

Quantitative research synthesis summarizes main trends in numbers, such as in an average effect size. Below we present four examples of research synthesis using an online findings-archive, in this case the World Database of Happiness. Each of these examples provides a different presentation format.

Example of a review of research on economic growth and happiness in nations

There is a considerable body of research literature on the relationship between happiness and economic growth in nations, most of which has been inspired by the 'Easterlin Paradox' (Easterlin 1974), which holds that an increase in personal individual income adds to happiness, but that a rise in the national income per head does not. By 1-10-2019, 47 research results on this subject were available in the collection of Correlational Findings of the World Database of Happiness, in the subject category [Economic growth/decline](#). These finding-pages contain information about the directions and strengths of the statistical relationships observed between economic growth and change of average happiness in nations. This allows the presentation of results in a stem-leaf diagram, as shown in [Chart 5](#). The numbers in this diagram denote observed correlations, which vary between +.001 and +.36. Links to online detail are embedded in each of these numbers. Using control+click the reader can open the corresponding finding-page on his/her screen. At a glance, one can

see that economic growth typically goes with rising happiness and the few zero-correlations at the bottom of the diagram show that the Easterlin Paradox describes exceptions rather than the rule.

Chart 5. 24 Research findings in correlation between economic growth and change of average happiness in nations

+1	
+0.9	
+0.8	
+0.7	
+0.6	3
+0.5	1 8
+0.4	1 1
+0.3	1 4
+0.2	0 1 3 4
+0.1	7
+0.0	01 01 01 01 02 02 03 05 06 07 08
-0.1	
-0.2	
-0.3	
-0.4	
-0.5	
-0.6	
-0.7	
-0.8	
-0.9	
-1,0	

Each sign represents a correlational finding reported in the World Database of Happiness. Use Control+click to see the details.

All blue numbers link to findings that are significant at the 5%-level. Orange findings are not significant at the 5%-level.

Source: Slag (2017)

Example of a review of research on happiness and home-ownership:

One of the biggest financial decisions we make in our life is to buy a house or not. There are evident advantages and disadvantages to buying or renting and the balance of these effects is likely to reflect in our happiness.

So, it is worth knowing whether or not home-owners tend to be happier than renters. By 1-1-2018, the World Database of Happiness listed 75 correlational findings on the relationships between happiness and [home-ownership](#). These findings are presented on [Chart 6](#) where positive correlations are denoted with a + sign and negative correlations with a – sign. At a glance, the reader will see that most correlations are positive, which suggests that home-ownership adds to happiness. However, positive zero-order correlations can be misleading, for instance if home-owners are more often married and their greater happiness is driven by marital status. Such spurious effects can be neutralized using multi-variate analysis. The column labeled ‘partial’ in Chart 5 shows the partial correlations with home-ownership that remain after control for such variables. Most of these partial correlations are positive and also suggest that home ownership fosters happiness. Longitudinal research designs are more suited to rule out spurious correlations and can help us identify reverse causation. Three longitudinal findings are available on the topic of home-ownership and all three show that a change to home-ownership is typically accompanied by a rise in happiness. Two experimental studies also demonstrate a causal effect of home-ownership on happiness.

Example of a review of research on happiness and healthy eating: Healthy eating adds to health and thereby contributes to a longer life, but will it also add to a happier life? Some people do not like healthy food, and since we spend a considerable amount of our life eating, being pushed to healthy eating could make these people’s lives less enjoyable. It is worth knowing whether this is the case or not and which people profit most and least from healthy eating. There is a small research literature on the relation between happiness and [healthy eating](#) which by 1-1-2018 had yielded 47 research findings, 42 of which are cross-sectional correlations. These findings are presented in [Chart 7](#), again presented in + and – signs and now with a distinction between two happiness variants, life-satisfaction and mood-level. We see mostly + signs (16), which indicates that people who eat healthy tend to be happier than people who do not.

Chart 6. 75 Research findings on happiness and home-ownership

	RESEARCH METHODS					
	Cross-sectional		Longitudinal		Experimental	
	Zero-order	Partial	Zero-order	Partial	Zero-order	Partial
Owned (vs. Not)	+ + + + +	+ + +/+ + + + + +/+ +/-				
Owned (vs. Rent)	+ + + + + ++ ++ ++ ++ ++	+/+ + + + + + + 0 +/+ +		+ + + +		+ +
Owned partially (vs not)		+ + + + +				
Owned (vs. used free of charge)		+ + + + +				
Rented (vs. used free of charge)		+ + + + +				
Redemption (vs. used free of charge)		+ + + + +				
Usufruct (vs. used free of charge)		+ + + + +				
Used free of charge (vs. not)		+ + + + +				

+ = 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
 -/+ = positive and negative correlations obtained with different sets of control variables or measures of happiness
 All signs involve a link to a finding-page with full detail in the [World Database of Happiness](#). Use control+click to view the page
 Source: [Veenhoven et al 2018](#)

Chart 7. 47 research findings on the relation between diet and happiness in cross-sectional studies

Diet	Correlation with overall happiness		Correlation with affect balance	
	Zero order	Partial	Zero order	Partial
Micro level studies				
Fruit and vegetables	+ +	+ + + +	+	+
Fruit	+	+		+ +
Vegetables		+		+
Fast food				- 0/-
Soft drinks	+ +	+		-
Fat avoidance	+			
Fibre intake	0			
Sweets	-	-		- 0
Cakes	-			
Grains		+		
Milk		+		-
Meat		+/- +		- -
Fish and fish products		+		+
Olive oil				+
Nuts				+
Calories	+	+		
Protein	+			
Fat	+			
Healthy foods	+	+		
Macro level studies				
Fruit and vegetables				

Use Control+Click to jump from a sign to on-line detail

+ = positive correlation, statistically significant

+ = positive correlation, not statistically significant

+/- = positive and negative correlations, depending on control variables used

0 = no correlation

- = negative correlation, not statistically significant

- = negative correlation, statistically significant

Source: [Veenhoven 2019](#)

A few – signs (3) are linked to unhealthy eating habits, i.e., fast food, soft drinks and sweets, and as such support this the idea that healthy eating will make you happier. Not all the findings support the view that healthy eating goes with greater happiness. Consumption of soft-drinks was positively related to overall happiness, although not significantly, while the correlation with affect balance was significantly negative. A high intake of high caloric protein and fat is generally deemed to be unhealthy but was found to go with greater overall happiness in a study among medical patients in Arkhangelsk in Russia, where the patient's medical conditions and the cold climate may have required a higher intake of such calory rich foods.

Example of a review of effects studies on happiness training

Most people want to be happy and reach out to opportunities for a more satisfying life. In response to this demand a growing supply of 'happiness trainings' has developed, mostly in the context of positive psychology. It is worth knowing whether these trainings really add to one's satisfaction with life. There is a recent research literature on the effects of positive psychological interventions and part of that research assessed effects on happiness in the sense of the subjective enjoyment of one's life as a whole. By 1-12-2019 the World Database of Happiness contained 179 correlational findings [kinds of happiness training](#) and [modes](#) of such training, 150 of which allowed computation of a comparable effect size. These findings are presented on [Chart 8](#). Effects tend to be positive across kinds and modes of happiness trainings and across research methodology, with an average rise in happiness of about 5%.

Current usage of the World Database of Happiness

Since its launch in 1998, the website of the World Database of Happiness has attracted about 1.4 million visitors, as can be seen [here](#). To date (1-10-2021) a search in Google Scholar yields 3.720hits, about half of which seem to denote active use of the findings. We are largely in the dark about use of the WDH for mere orientation on happiness research.

The use of this database as an online appendix in synthetic papers is rather new. A listing of our own research syntheses using this findings-archive is given in [Chart 9](#).

APPLICATION ON OTHER SUBJECTS

Although developed for the study of happiness, the technique of a findings-archive can also be used for synthetic studies on other subjects. In the field of psychology, the technique can be used to organize the abundant research findings on subjects such as 'depression', 'self-esteem' and 'achievement motivation'. In sociology is can be applied on subjects such as 'trust in institutions' and in political science to 'support for democracy'. Part of the classifications in the World Database of Happiness can be used in these cases. The basic technique of a findings-archive can also be applied to subjects in the health-sciences.

Availability of the software

The software used for this findings-archive consists of three apps:

- A Microsoft Access database with forms and queries in order to manage (add, change, delete) data on happiness research. In the forms is made use of: "Visual Basic for Applications (VBA) for Office, a simple but powerful programming language that you can use to extend Office applications."
- A Microsoft Azure SQL Database containing 'tables' with the happiness data, 'views' to present data and 'stored procedures' to manipulate data.
- A website with search tools to present the data, made in WordPress.

Copies of this software are available freely from the Erasmus Happiness Economics Research Organization EHERO. Mail to: ehero@ese.eur.nl. EHERO staff is available to support the adjustment of this tool for use on other subjects than happiness.

Chart 8. 150 research findings on the effect of happiness trainings on happiness observed in 55 studies
Effect sizes expressed in % change on scale range

NATURE OF HAPPINESS TRAINING	METHOD OF INVESTIGATION				
	Cross-sectional had training vs. had not	Longitudinal before vs. after training –			
		Change in treated group only		Difference with change in control group	
		Post intervention	After follow-up	Post intervention	After follow-up
Single kind of training					
Best –possible –self exercise		+5.1	+1.6	+0.5	–2.3
Cognitive reframing		+13.7		+12.5	
Enlightenment about happiness		+0.8 +3.9	+3.2	–2.9	
Goal setting training		+13.4/+10.4 ^c +2.9 +3.6 +5.1 ^a –1.3	+11.9/+10.4 ^c +1.1 +1.6 ^a +3.6	+8.6/+9.5 ^c +0.5 ^a +4.300	–2.3 ^a 0
Laughter Yoga		+8.6		+8.6	
List and practice perceived ways to happiness		+0.6/+7.2 ^c			
Practice retrospective sources of happiness		+12.5		+12.5	
Live up to one's values		+1.0 +4.0	+2.5	+5.0 +7.8	+5.8
Meditation, mindfulness	+2.9	+4.1 +13.2 +4.6 +18.0 +8.7	+5.0 +5.6 +17.6	+8.0 –0.6 +18.0 +9.0	–0.7 +16.7
Novelty trying		+3.6 ^a	+1.1 ^a	0	0
Life –review exercise					–0.9/–4.6/0 ^c
Mood –awareness training		+3.9/+3.7/+0.7 ^c	+4.2/+3.7/+1.2 ^c +18.9/+23.2 ^c	+2.0/+4.0/+0.7 ^c	+0.4/+1.1/+1.1 ^c
Positive thinking training		+2.4 +13.7 ^a +4.0	+7.0	–0.4/+12.5 ^a +5.0	–2.9
- Count blessings and curses	+6.50 –3.3 ^a	+0.7 +2.4 ^a	+1.5		
- Gratitude training	+12.3–3.3+14.0/+7.9 ^c +5.4	+1.5 +2.4	–0.7	–0.8	–0.2
- Kindness training	+13.3/+6.0 ^c	+0.6/–2.9 ^c		+3.6/–4.0 ^c	
- Recall of positive events		+1.9 +0.7 ^a +3.0 +4.9	+3.5 +1.5 ^a	+4.0 +3.3	
Savouring training		+1.3	+0.3	+1.6/+1.1 ^c	–0.2/–0.1 ^c
Multiple kinds combined					
Training of multiple mental skills		+195 +10.0 +6.7 +3.7 +3.6 +7.8 +5.9 +15.2/+14.8 ^c	+13.9 +30.8 +15.8 +0.4 +8.5 +11.8/+14.8 ^c	+29.0 ^b +8.3 +3.4 +2.0 +3.5 +23.8/+23.4 ^b	+27.9 ^b +10.4 +10.4 –10.8 +23.4/+25.4 ^b
-Enlightenment + exercises		+4.0 +7.8/+19.6 ^c		+3.9 +8.7/+10.9/+18.5 ^c +3.6/+3.0/+10.1 ^c +21.6/+46.1 ^b	
Number of studies and participants					
Number of studies	8	39	22	31	14
Participants (N)	630	3539	2126	3562 ^d	1664 ^d
Mean N	79	91	97	115	119
Median N; range	61; 31-192	43; 10-606	53; 10-606	73; 23-631	89; 37-360
Results					
Mean change	+5.6 %	+6.0 %	+7.7 %	+4.7 %	+1.8 %
Median change	+6.0 %	+4.0 %	+4.3 %	+3.9 %	–0.1%

Signs link to finding-page in [World Database of Happiness](https://www.happiness.com/). Use control+click to view the page.

a: not included in calculation of mean/median because study appears twice in a column

b: not included in calculation of mean/median because of a huge decline in happiness in the control group (treated as outliers)

c: average value of multiple measures/multiple comparison groups used in calculation of mean/median

d: numbers of participants and controls added up

Source: [Bergsma et al 2020](https://www.happiness.com/)

Chart 9. Research syntheses that use links to findings in the World Database of Happiness

Subject Happiness and	Number of studies	Number of findings	Source
<i>Links to finding-pages</i>			
Consumption	108	423	Veenhoven et al 2018
Economic growth	9	24	Slag 2017
Freedom	11	112	Abdur Rahman & Veenhoven 2018
Happiness training	61	179	Bergsma et al 2020
Healthy eating	20	47	Veenhoven 2019
Internet use	34	117	Veenhoven & Vogelaar, 2019
Self-employment	34	138	Liu & Veenhoven, 2019
Private wealth	72	119	Jantsch & Veenhoven 2019
Urban green	123	198	Jantsch & Veenhoven 2021
	13	38	Veenhoven, Wagner & Ott 2020
<i>Links to selections of findings</i>			
Civilization	14		Veenhoven 2014
Informed choice	68		Veenhoven 2015
<i>In preparation together with</i>			
City design	Sahar Samavati, Tarbiat Modarres University, Teheran Iran		
Home-makers	Shoirakhon Nurdinova, Namangan State University, Uzbekistan		
Mental disorders	Valerie McGaha, Oklahoma State University, USA		
Modernity	Paul Thomas, economist India		
Retirement	Nuan-Ching Huang and Wan-Chen Hsu,		
Sporting	Shruty Agrawal, Malaviya National Institute of Technology, Jaipur, India		
Tourism	Ondrej Mitas, Breda University for Applied Sciences, Netherlands		
Transsexualism	Jos Veenhoven, Erasmus University Rotterdam, Netherlands		

Citation

Cite this tool as: Veenhoven, R., Brands, P., Buijt, I., DeGroot, F., DeHeer, H., Erdtmann, S., Gabriel-Tellers, O., Radema, F. & Rehorst, R. (2021) *FindingArchiver 2.0: Support System for Research Synthesis*, Erasmus Happiness Economics Research Organization, Erasmus University Rotterdam, Netherlands

DIFFERENCES WITH OTHER REVIEW SUPPORT SYSTEMS

Difference with bibliographical systems

Review of research starts with taking stock of the available publications and list these in a 'bibliography'. In the past, such collections of publications on a subject were often maintained by institutes in the field but today we rely more on searches in electronic archives of scientific publications such as Google Scholar. A findings-archive is more than a bibliography; though it starts with a collection of publications (cf. section 2.2.1), its main content consists of research findings extracted from these publications. In the case of the World Database of Happiness, another difference is that its underlying 'Bibliography of Happiness' restricts to publications that deal with a specific *concept*, while literature searches focus on *words*. Another difference with common bibliographical systems is that the Bibliography of Happiness provides a detailed subject classification.

Linked references

Reference lists are an integral part of review studies and for long the full text of referenced publications was not readily available. Today, ever more research reports become available on-line and links to these publications begin to appear in reference lists. This provides readers of review studies better access to the original research reports but that will not free them from the Babel that typically limits their view on the comparability of the reported results. Finding-pages describe empirical observations in a standard format and terminology (cf. section 2.1) and thus bypass this problem. Finding-pages also

Differences with evidence platforms

Evidence platforms are websites that present reviews of the available empirical research on a topic. A difference is made between scientific evidence databases and more popular evidence portals.

Evidence databases

These platforms list effect studies and systematic reviews on particular topics. These reviews are often made by a group of researchers who follow a common methodology. The main player of this kind in medicine and health care is the [Cochrane group](#), the core of which is the collection of Cochrane Reviews, a database of systematic reviews and meta-analyses which summarize and interpret the results of medical research. The Cochrane Library makes the results of well-conducted controlled trials readily available and is a key resource in evidence-based medicine. The [Campbell Collaboration](#) summarizes and evaluates the quality of evidence about programs in the social and behavioral sciences. The aim is to help people make better choices and better policy decisions". The [What Works Clearinghouse](#) (WWC) reviews the existing research on different *programs, products, practices, and policies* in education. Differences with a findings-archive are 1) These databases present existing research syntheses, while a finding archive prepares for (ongoing) research synthesis. 2) These databases list publications, while a findings-archive lists observations. Evidence databases are in fact annotated bibliographies.

Evidence portals

Evidence portals are often based on evidence databases and present research evidence in a form accessible to policy makers and practitioners, typically using info graphics. The World Database of Happiness is tailored to scientists in the first place and serves as a basis for distilling policy recommendations rather than communicating these. Like evidence databases, a findings-archive can serve as a platform for scholarly cooperation. In the case of the World Database of Happiness this is the group of [associated researchers](#)'.

Difference with programs for Meta-analysis

There are several software packages to support quantitative meta-analysis, such as [Comprehensive Meta-Analysis Software](#) (CMA). The focus of these programs is on statistical analysis. Similarities between a findings-archive and a program for meta-analysis are 1) that the primary contents consist of research observations, expressed in numbers such as means and correlations and 2) that they prepare for research synthesis. Differences are: a) Programs for meta-analysis are designed for statistical *analysis* in the first place, not for *storage* of research findings, b) as such they facilitate the end phase of the review process, while a findings-archive supports the earlier phases of selection, and description. A findings-archive *prepares* for research synthesis, among which meta-analysis. Programs for meta-analysis can include functions of a findings-archive. Since their format is mostly a spreadsheet, they can include detail about the studies included. Though possible in theory, we have not yet seen such applications.

STRENGTHS AND WEAKNESSES OF THE TECHNIQUE

Like any tool, this findings-archive has its pros and cons. Its qualities should be compared to alternative sources of information about research-effort in a field; that is, with searches in bibliographical systems such as Google Scholar, with narrative reviews of the literature and with data banks.

Strengths

Conceptual focus

The technique presses to conceptual specificity, its laboriousness urges to selectivity and selecting valid measures requires clear definition of the core variable. In the case of happiness this makes a big difference with bibliographical systems; a search in Google Scholar on the word 'happiness' yields 2,240,000 hits, while the World Database of Happiness includes only 13,000 studies that fit a strictly defined concept of happiness. Conceptual clarification and subsequent selection are initial steps in research synthesis.

Comprehensive overview on a subject

A findings-archive provides an overview of research on a specific subject, not only of 1) scientific publications (as bibliographical systems do), but additionally 2) of valid indicators of the focus variable and 3) of research-findings obtained with these indicators. Getting an overview is also a preliminary step in research synthesis

Comparable description of research findings

Findings are described in a standard format and terminology. Each finding-page involves information about 1) measurement, 2) population, 3) sampling, 4) time and 5) statistics. Eventual elaborations are reported in detail as well. Statistics are homogenized as far as possible. As such the technique prepares for research synthesis. Use of links to on-line finding-pages allows condensed review reports. On-line availability of electronic findings pages allows for a new technique in the reporting of synthetic studies. Many findings can be condensed in a few tabular overviews, with details given in links to finding-pages in the on-line findings-archive, as illustrated in section 3.3 of this paper.

Continuous collection

A findings-archive is meant to store research output on a continuous basis. Review studies are typically one-time endeavours that do not build on one another (cf. section 1.2). As such, the technique of a findings-archive adds something new to the field of research synthesis.

Powerful search tools

A particular strong point of the World Database of Happiness is that its website is equipped with more [search tools](#) than commonly available in bibliographic systems, in particular with fine grained subject classifications, based on concepts rather than words. This helps to find one's way in the data deluge.

Weaknesses

Conceptual rigidity

The above-mentioned strength of conceptual specificity has a price; one cannot easily include new topics in the archive.

Entry of findings laborious

The entering of research findings takes considerable time, on average about 3 hours per finding. When the time for gathering eligible studies and system maintenance is taken into account, the time investment is about 5 hours of a finding. This is the price of the above-mentioned strengths, and in particular of the detailed description of findings.

Not fully up to date

There will always be sometime between publication of a research report and entry of the findings in the archive. The size of the backlog will depend on the available workforce and priorities in entering will give differences in coverage across topics. In the case of this World Database of Happiness, the collection of distributional findings on happiness in nations is fairly well up-to-date but about half of the available correlational findings is still waiting to be entered in the archive. Collections of correlational findings on a particular subject are typically completed in the context of a research synthesis as is the case with the topics listed [here](#).

Navigation on website not easy

The structure of the website will be uncommon for first users, in particular its subdivision in different 'collections' and 'reports' and its variety of search options. At least in the case of the World Database of Happiness it takes some effort to find one's way into the wealth of information. Inpatient users can revert to the [search all](#) function, which is a Google search on words within the archive.

HIGHLIGHTS

- A findings-archive is a support system for research synthesis. It consists of electronic 'finding-pages' on which research findings are described in a standard format and terminology. Each page has a unique internet address.
- The technique supports the initial stages of research synthesis of gathering research findings on a particular topic and description of these in a standard format and terminology
- The system enables for continuous collection together with colleagues all over the world.
- The technique facilitates presentation of research findings in synthetic papers using links to detail on online finding-pages.
- Though developed for the subject of 'happiness', the technique can be applied on any other subject of empirical research. The software is free available.

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