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**COMMUNICATION AND PERCEPTION: WHICH WORLD DO STATISTICS LIVE IN?**

**Invited Paper**

Submitted by Federal Statistical Office Germany<sup>1</sup>

**I. INTRODUCTION**

1. How does the general public perceive our statistical figures? How do people react to statistical information which is contrary to their expectations? To what extent are individuals able to distinguish between averaged data and the observations they make in their own personal environment? The author claims that the public perception plays a major role in the successful communication of statistical results – a role which is broadly underestimated in Official Statistics. The importance of public perception has often been neglected in Official Statistics. This can seriously harm the credibility of a National Statistical Agency. In the paper, the aspect of perception is examined using several examples from social statistics as well as statistics of prices, income, retail trade and labour force.

2. What conclusion are we to draw? Important aspects of the quality issue are relevance and coherence. If we want to take these aspects into account, then we have to rely on what the recipients actually receive – and not on what we are sending them. The users do not perceive our statistical results as isolated facts. They will always tend to translate the statistical findings into their personal context and to check whether the figures match their own experiences and expectations. Is it really a match or sometimes more a case of mismatch? Should we leave our users alone with their “cognitive dissonance” or should we help them to dissolve it? It would appear crucial for Statistical Agencies to gather more knowledge on phenomena such as public perception, possibly in cooperation with research institutes or universities. In this paper, as an example, the author presents the results of a very challenging cooperation with Prof Brachinger from the University of Fribourg.

3. How do we communicate? The process can be regarded as a triangular relationship between the Statistician, the users and the media. The press, television and other media are the main sources of information for most of our users on their social and political environment. The media creates a context that we have to account for if we want to reach our recipients. Our figures are relevant, if the users are able to interrelate them to the other things they hear in the media. Our figures should be “policy relevant”, but not “policy driven”. They should clearly relate to other information reaching the recipient – without being biased or judgemental. On the other hand, the media is vital for Official Statistics in order to improve the communication with the public. Using powerful information channels, a gap between public perception and statistical findings can be dissolved by explaining possible reasons for discrepancies. If this is done early enough, possible credibility crises can be avoided. Risk management should be a part of our communication strategy.

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<sup>1</sup> Prepared by Sibylle von Oppeln-Bronikowski, sibylle.oppeln@destatis.de

## II. PERCEPTION OF STATISTICAL RESULTS

4. In May 2005 the Federal Statistical Office Germany (Destatis) was challenged by headlines in two newspapers – the well known and widely read BILD, a yellow press paper, wrote: “What about you? Do YOU have a net income of 3753 Euros, too? How federal statisticians calculate to make families appear rich”. The “Hamburger Abendblatt” captioned an article: “Look how the Federal Statistical Office calculates. Families have a net income of more than 3700 Euros!” What had caused the public outcry? The day before we had launched a press release entitled: “Monthly net income of families just above EUR 3,700 on average.” In the text family was defined as couples with children younger than 18. The public reacted instantly and our office received hundreds of telephone calls. The comments were not always friendly. We could say: O.K., that’s life, we cannot please everybody. Our calculations are correct. We are statisticians. We supply objective figures. We are safe as long as we do not stray from the path of virtue...

5. But how do you define the truth? Does an average income reflect reality? To what extent are we responsible for the perception or misperception of statistical results? It is important for statisticians to take dissenting perceptions seriously. First of all we need knowledge about the essence of perception. A simple definition might suffice for the moment: In psychology and the cognitive sciences, it is defined as the process of acquiring, interpreting, selecting and organizing sensory information. Whenever a receptor gains information that does not suit his/her personal experience it is filtered out or produces resistance. In this context I would like to quote a German economist and philosopher, Hans Albert, who emphasized the role of cognitive factors in the explanation of economic and social processes: “The strict delimitation from psychological theories has proved to be a hindrance to the progress of economic thinking... thus it is absolutely legitimate if economists, in order to explain economic and social processes, rely on behavioural theory to have a solid foundation taking cognitive factors into account.” Another professor of economics, Ernst Fehr from Switzerland, even claims that we have to discard the *homo oeconomicus* concept: “Economists are frequently mistaken in their forecasts, because traditional economics does not care about people’s emotions and concrete goals.”

## III. EMOTIONS – A POTENTIAL RISK WHEN INTERPRETING DATA

6. To what degree are statistics affected by emotional factors? To what extent can statistical results provoke public anger? Official statistics is confronted with topics which are more rationally perceived such as average temperatures as well as with emotional topics such as bird flue or unhealthy food. As far as the more emotionally charged issues are concerned, we can ascertain that they are taken very seriously by political decision makers. For instance, in Germany a Federal Institute for Risk Assessment was recently established. Last Year a Conference was held in Berlin entitled “What does a crisis cost”.

7. In Germany as in many other European countries, the National Statistical Office came under public attack after the Introduction of the Euro notes and coins in January 2002. The Euro was subsequently given the nick-name TEURO which loosely translated means “expensio”, demonstrating that the general public perceived a sharp increase in prices. This perception however was generally not supported by the official Consumer Price Index (CPI). The CPI indicated a fairly moderate annual increase of 2.0 percent on average. Destatis was not really prepared for this debate and to an extent our communication failed in the initial phase. In the following process we were then forced to learn about perception in order not to lose our credibility. It was crucial to find the right balance and gain key partners from the scientific and media sector.

8. To gather more knowledge about public perception especially as far as perception of inflation is concerned, Destatis started a challenging cooperation with Prof. Brachinger from the University of Fribourg Switzerland. Starting from fundamental psychological insights over human perception, Brachinger (see Brachinger 2005, 2006) had developed a theory of inflation perception helping statisticians to understand the gap between the official CPI and perceived inflation in Germany. The main idea of this theory is that, with respect to a certain reference price, price increases are seen as losses and price decreases as gains. People experience losses to a greater extent than gains or stable developments (so called loss aversion), and they experience losses even more strongly if they are confronted with them on a regular basis. On the basis of this theory, to measure perceived inflation, Brachinger proposed a perceived inflation index (“IPI”). This index has been calculated and lead to a very surprising result: The

*IPI* rose sharply one year prior to Euro cash introduction. In January 2002 the perceived inflation reached more than 10.6% compared to the official CPI of 2.0%.

#### IV. CAN STATISTICS DESCRIBE REALITY?

9. A further headline in a serious newspaper questioned our credibility in October 2005: “The myth of German thrift”. A Destatis press release about monthly savings had led to misunderstandings and irritation. The headline of the press release said that German households save 160 € per month on average. The arithmetical mean however is very misleading! Unlike body size, the margins between poorer and richer households vary considerably. In general, a lot of thought needs to go into the dissemination of data on income, expenses, sales of large and small firms, earnings etc.. In his first lesson for young statisticians the highly esteemed Prof. Wagenführ said: “Be careful when calculating mean values! They can be very misleading. As statisticians we have a large responsibility to use them appropriately.” In certain cases mean values are a great help. For instance, it is very useful for office chair producers to know that the average size of office workers is 172 cm and to have an idea of the variance. But the mean value is not suitable for many other things we want to measure. I am convinced that this realisation should have a greater impact on our work in official statistics.

10. Another interesting question is how statisticians describe results in official publications, in press releases or on the Internet. Sometimes it seems as if written texts are tables. Percentages and averages are presented without any background information being provided or stories being told! More attention is paid to the super-correctness of the figures. Precise percentages with two decimal places evoke an “illusion of truth and certainty”. But like a rose cannot be sufficiently described by its measured length – without reference to colour and perfume – statistical results are more easily understood in a context that takes a multifaceted reality into account. Visual means can help to understand results and we should opt for more innovative illustrations such as box plots. In order to visualise statistical results containing large divergences, such as the production in different regions, a mean value can be presented whilst also illustrating the range from the region with the lowest and the region with the highest production level.

#### V. COMMUNICATION OF STATISTICAL RESULTS

11. Why are we reflecting on how statistics are perceived? Because we want to be understood! But how can we establish whether we are being understood correctly? This is where communication sets in. Similarly to the very common physics experiment called the Newton’s cradle or “tik-tok” we want information to come in as we send it out. Communication comes from the Latin word *communicare* which means to share or to interact. This interaction can occur both directly or indirectly.

12. For us, the statistical publications are our main communication channel - especially those presented on our website. Indirect lines of communication are the mass media and politics. All three lines have advantages but also entail the risk of misinterpretation. The risk of the direct line is our specific statistical language and the lack of sufficient and understandable metadata. In this case, information services at a high quality level can help to identify and to close the gap between sender and recipient. Mass media are important as they make statistical results known to the public, but they have their own interests and often tend to publish bad news rather than good news. Active press offices work closely with the press, which is a major communication line. Politicians like to use statistics if they are useful for them – which can lead to misuse of data. In Germany our office installed a special information service unit for key clients in the German capital. This service caters for Members of Parliament, all federal ministries and other key users in Berlin such as consulates. The office is located in the German parliament and provides a rapid response service that caters to the needs of this specific client group.

#### VI. SUMMARY

13. Summarizing, I quote a well known statistical capacity, Mr. Fellegi from Statistics Canada, who pinpointed why we pay attention to perception: “Credibility is a matter of perception. It should be seen institutionally and technically. Most important is our concern about the product. This touches our values. A good reputation is easy to loose, but very difficult to establish.”

14. The main issues on our way to a high quality profile are well known and widely accepted. The focus in respect to good communication – in my opinion – should be placed on quality reports, subject-

related and comprehensive responsibilities, independence from political influence and an increase in methodological expertise by involving interdisciplinary science.

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