



Précis [pʁe 'si:]

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Digitalization vs. Robotization

Framing Effects on Fear in Context of the Digitalization of Work

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Abstract

The digitalization of work may lead to massive job losses in near future. However, public opinion polls show, that concerns regarding losing one's job are currently quite low.

I argue that this gap is explainable through simply framing this development as "digitalization", which is a highly positive connoted term in German media landscape. In contrast, referring to the same process in a more technical way as "robotization", will lead to a higher amount of fear for losing one's job.

I tested this assumption in a quantitative online experiment (N=214) and found partial support for my hypothesis.

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His master thesis focused on the effects of frames in context of media coverage about digitalization. His research interests lie in the field of fear communication as well as societal perceptions of digitalization.



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Introduction

Digitalization! A word primary connected to progress and benefits. Digitalization is one of the most mentioned and highlighted processes in modern societies that is heavily supported by politics. Recent studies show that citizens perceive digitalization as (very) beneficial (DIVSI, 2017) and the media also portray digitalization as positive (Zeller, Wolling & Porten-Cheé, 2010).

Besides this trend, there is a growing concern, especially from economists, about the effects of a rapid transformation of the job market that is based on digitalization. With robots that can work harder, longer and more efficient, especially routine jobs may become obsolete. Thus, Frey and Osbourne (2013) stated in their often-cited study that the advance of digitalization may contribute to a potential loss of millions of jobs worldwide. Transmitting the method of the study to the German job market, Bonin, Gregory and Zierahn (2015) as well as Brzeski and Burk (2015) highlight equal effects for the German job market.

A scenario that may scare citizens? Definitely one can argue that the loss of a job is a highly relevant existential threat (Gross, 2015). However, several studies indicate that the current concerns about losing one's job (R+V Versicherung, 2018) and specifically losing it in result of technology advancement is relatively low in German society (Statista, 2016). But how to explain this gap of scientific concerns and public opinion? I argue that, beneath the positive emphasis on digitalization in the media (Zeller, Wolling & Porten-Cheé, 2010), the basic designation of the process as 'digitalization' keep worries about losing one's job in bound. Thereby 'digitalization' as a primarily progressive connoted and most commonly used phrase mitigates the evocation of fear, whereas other terms like 'robotization', which function as a more graphic term for the same process, might lead to greater increase in fear.

To summarize, this précis gives answers to two questions. Firstly, whether and to which amount news

coverage about negative consequences of working place digitalization can elicit fear in the first place. Secondly, whether there is difference in the effect, when framing this process as 'robotization' instead of 'digitalization'.

I tested my assumptions in a standardized experimental online survey. I especially researched the effect of media coverage on the emergence of fear and the differential effect of a 'digitalization' vs. a 'robotization' frame in news articles. Before reporting the empirical evidence, I will briefly describe the process of digitalization, the framing concept and media effects concerning fear.

Digitalization

Digitalization is in its simplest form the transformation of analogue in digital data (Gray & Rumpe, 2015; Hamidian & Krajo, 2013). With this process, that is highly connected to the emergence and use of the internet (Kollmann & Schmidt, 2016), information is detached from location and time and can be sent, transferred and processed (Bengler & Schmauder, 2016). Nowadays researchers state that with the rise of digital technologies digitalization has found its way into society (Kollmann & Schmidt, 2016).

Building on this, several scholars emphasize the prominence of digitalization for society. Through this process society significantly changes on several layers (Bengler & Schmauder, 2016). Individuals, organization as well as society as a whole have to, at least somehow, adapt to the rules of digital technology. Obviously, all societal arenas are also influenced: education, politics, everyday life – and the economy.

Digitalization and economy

The influence of digitalization on economy is essential (Hamidian & Krajo, 2013). Some scholars speak in terms of industry 4.0 or even the 4th industrial revolution (Dengler & Matthes, 2015, Hirsch-Kreinsen, 2015). The process has ambivalent effects (Brynjolfsson & McAfee, 2014) and in consequence, the economic system as well as the conditions for employees' change (Hamidian & Krajo, 2013). The industry profits from an increase of

flexibility and productiveness in multiple sectors for example communication or logistics (Hamidian & Kraijo, 2013). In this process many sequences get automated or are adopted by machines, respectively robots (Schneider, 2017). Therefore, the term robotization is sometimes used, too.

Consequently, employees have to adopt to these challenges as job routines change (Hirsch-Kreinsen, 2015). Employees need further education to get a better understanding of technology and the competence to work with them. Sometimes, they have to adapt to a serious change in their job profile, since machines can overtake a huge portion of their job (Kollmann & Schmidt, 2016; Poschmann, 2015). In sum, digitalization has a huge impact on the job market.

Frey and Osborne (2013) analyzed the endangering of 702 job profiles in the US through computerization. Building three risk groups (low, medium, high), they conclude that up to 47% of the job profiles in the US belong to the high-risk group. Looking at the jobs, they state that mostly jobs in transport, manufacturing industries but also administrative jobs are highly affected by digitalization. Furthermore, they found a significant correlation between low income as well as educational level and the endangerment of jobs. Thus, they fear a further societal divide due to a rise of inequality in employment and distribution of wealth.

Anyhow, the study is limited by the fact that Frey and Osborne (2013) only calculated the percentage of jobs that could be omitted due to the digitalization of work. This percentage should be considered as a potential for job losses and cannot be equated to actual numbers. In fact, they stress that job profiles are in permanent change and adopt to the process of digitalization. However, a great substitutional potential could be identified. These findings are validated in the studies of Bonin et al. (2015) as well as Brzeski and Burk (2015) for the German context.

In light of these findings, it seems reasonable that employees hearing of those predictions become

frightened of losing their job. In the following a brief overview of the concept of fear is given.

Fear of job loss

Fear is defined as an emotional, cognitive and physical reaction to a perceived or actual threat that has a consequence on human behavior (Flötmann, 2015; Krohne, 1996; Stöber & Schwarzer, 2000). The processing and evaluation of the threat situation is thereby highly subjective and aims at controlling the fear (Essau, 2014; Freeman & Freeman, 2012). Fear is a painful feeling (Levitt, 1987) that can be described with words like fearful or scared (Harmon-Jones, Bastian, & Harmon-Jones, 2016). Fear of a job loss is counted as an existential threat (Gross, 2015) since it is situational specific and depicts a threat whose consequences are serious on an existential level.

However, current (market research) studies suggest that fear of a job loss is currently relatively low in the German public (R+V Versicherung, 2018). Going in more detail another survey concludes that fear of a job loss caused by technology advancement is in general relatively low either (Statista, 2016); though, it is noteworthy that there are some differences regarding to the field of employment. Especially employees in industry do report some concerns that their jobs might be substituted due to technology advancement.

Turning towards the potential effects of media in case of fear incitement, several researchers stress the potential for such an effect (Altheide, 1997, Furedi, 2007). Especially in terms of crime (Chiricos, Padgett & Gertz, 2000; Heath & Gilbert, 1996;), terrorism (Mythen & Walklate, 2006; Nellis & Savage, 2012) or health issues (Witte & Allen, 2000) effects of media stimuli on perceived fear can be found. Thus, I propose the following hypothesis:

H1: News coverage about the potential of job loss through digitalization elicits fear in readers.

Digitalization vs. Robotization frames

Zeller, Wolling and Porten-Chée (2010) found that the news coverage about digitalization in the German media landscape is in general positive. It might be due to this circumstance that digitalization is predominantly perceived to be a good thing. The positive connotation of the term digitalization might thus cover possible negative effects. Anyhow, there are other terms that are equally used, for example ‘computerization’, ‘automatization’ or ‘robotization’. I research whether it changes the effect of the news article if the term is simply exchanged.

Therefore, I argue on basis of equivalence framing theory (Kahnemann & Tversky, 1979; Matthes, 2014). Typically, equivalence framing studies use experimental designs and present a positive and a negative frame (Levin, Schneider & Gaeth, 1998). The basic idea is that the facts described are logically equivalent in both cases, but expressed in linguistically different ways. For example, one can say that the unemployment rate is 10%. However, another option is to emphasize that the employment rate counts 90% (Chong & Druckmann, 2007). Therewith, the same information is presented in two different ways. Levin et al. (1998) studied the mechanism of such frames in the context of assigned attributes. They conclude that positive frames generally contribute to a positive evaluation of the subject per se.

For my study I slightly adapted this research. On basis of the study of Zeller et al. (2010) I treat digitalization as a positive frame. Furthermore, I choose robotization as the negative counterpart, since robotization might emphasize the notion of machines that replace humans. This imagination is more tangible and may influence emotional processing. This leads to the second hypothesis:

H2: The robotization frame elicit more fear among readers than the digitalization frame.

Method & Measurement

To test the hypotheses, a standardized experimental online survey with two groups was conducted. To

achieve an accurate sample of the online population living in Germany the online-panel of respondi AG (Cologne) was used. Altogether 214 participants answered the questionnaire. Participants had to answer some questions concerning their demographics and their current emotional state and were afterwards confronted with a text that dealt with the consequences of digitalization on the job market. The text was an adapted version of a news magazine article (6197 words) of *Der Spiegel* (Dettmer, Hesse, Jung, Müller & Schulz, 2016).

The text covered the potential changes in working environment and stressed the dangers for substitutions of jobs. Albeit the emphasize on the serious consequences of this process, some protective measures against this trend were discussed. The texts (501 words) were in both framing conditions identical except for the frame words; thus, one text contained only mentions of ‘digitalization’, respectively ‘digitalized’ and the other one ‘robotization’, respectively ‘robotized’. These frame words occurred seven times in each of the texts. Accordingly, both texts only differentiated just in the mention of one term. After the stimulus, participants had to indicate their emotional status again. Finally, participants were thanked and given an incentive.

The sample consists of 116 women (54.2%) and 98 men (45.8%). The educational level is quite high with 86 participants (40.2%) holding a high, 79 (36.9%) holding a middle and 49 (22.9%) participants holding a low educational degree. The mean age of participants was 45 years (SD=15.3).

Fear was measured two times, before and after the stimulus. Participants had to indicate on a 7-Point-Likert scale (1=disagree strongly to 7=strongly agree) whether they feel fearful, scared and worried. Beneath these emotions that constitutes fear, several other emotional feelings were asked to prevent anticipatory effects. Furthermore, the item battery was rotated at both points of measurement. For the emotion fear two mean indices were calculated. The scales showed good reliability with Cronbach’s $\alpha=.908$ for the pre- and Cronbach’s $\alpha=.944$ for the post-measurement.

Results

To answer the hypothesis a mixed design ANOVA was calculated with the pre- and post-measurement of fear as repeated factor and the frame term as between-subject-factor. The analysis shows that there is a significant main effect for the arousal of fear, $F(1, 212)=12.01$, $p<.05$ by the texts. Thus, participants' fear under both conditions rise on average 0.28 scale points. This supports hypothesis 1.

Furthermore, there is a tendency towards an interaction effect with fear and the frame term, $F(1, 212) = 3.69$, $p<.10$ indicating a heavier effect of the robotization frame on fear. On average fear increased on only 0.13 scale points in the digitalization frame group whereas the inclination in the robotization group counted 0.25 scale points. However, the data do not support H2, but the results show a tendency towards the expected results.

Discussion

The public discourse about the changes on the job market is predominantly circumscribed with the term 'digitalization' or 'industry 4.0' that are highly positively connoted in the German media landscape and in the minds of citizens. Thus, I argue that the 'digitalization' experimental group symbolizes a rather common news article concerning the changes of digitalization on the working environment. Indeed, the original *Der Spiegel* article mentioned the term digitalization/digitalized 16 times, whereas robotization/automatization was only mentioned six times.

In this light, it is interesting to look at the results of the study. While there is a general support for the hypothesis that the news article – independent of the frame – did lead to an increase of fear (H1), I also measured a tendency towards the assumption that the robotization frame did elicit more fear than the digitalization frame (H2). Thus, confronted with a threatening situation of losing one's jobs to working environment digitalization, it seems relevant how and with what key terms this trend is paraphrased. The generally positive attitudes to-

wards digitalization may contribute to answering the question why the digitalized frame article only leads to a small increase of fear in participants and even more, why the fear of losing one's job is quite low in society. If other equal terms like 'robotization' dominate the public and media discourse, the whole perception on the trend of the digitalization of the working environment might be more negative – and more fearful.

Summing up, this study shows that frames about the digitalization of working environment do matter in terms of the incitement of fear. The digitalization frame only has a minimal impact on the incitement of fear, even if the trend is portrayed as a threatening situation. Robotization in contrast does lead to a higher amount of fear. Altogether, this study contributes to the question why the perception of dangers for the safety of jobs is rather low in German society.

However, according to economic scientists, digitalization will soon lead to a massive change in the job market with many citizens being at risk to lose their jobs. It will be interesting for further research to investigate, if, when and under what circumstances perceptions of digitalization in consequence might change. Yet, the status quo is that digitalization is perceived relationally positive and has only little potential to elicit fear, even if it is discussed in a threatening way.

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