Berkers H., Rispens, S., & Le Blanc, P. M.

The Influence of Robots on Work Characteristics

Purpose & Originality

Robots are likely to change how, when, with whom, and where we work. Based on recent estimations, 47% of the jobs can be computerized (Frey & Osborne, 2013) and with robots entering a variety of workplaces the work executed by robots is expected to double (*WEF*, 2018). Most academic and public attention has been on robots replacing or displacing human employees (Frey & Osborne, 2013), which obscures the consequences robotization may have for the design of remaining jobs (Barley, 2015; Cascio & Montealegre, 2016). How work (and its quality) changes after robots are introduced is therefore an important question to address. In this study we answer the question how robotization affects specific job characteristics and how this translates into employee outcomes, because the impact of robots on employee well-being and performance is also still mostly unknown (Körner et al., 2019).

Drawing from the model of work design antecedents of Parker, Van den Broeck, and Holman (2017), technology influences how work is organized and thus we expect that robots affect work characteristics (Berkers et al., 2019). Based on previous research on the effects of technology on work design, these effects could be both positive and negative (cf. Bala & Venkatesh, 2013; Gough et al., 2014; Parker, 2003). There is a substantial risk of poorly designed jobs, especially for low-skilled employees (Autor et al., 2003; Parker et al., 2019; Wood, 1982), if robots decrease job quality through a negative influence on work characteristics (e.g., autonomy, task identity). As a result, robotization may, unintentionally, imply a step back towards scientific management, despite the rich body of evidence on 'good' work design that is currently available (Parker, Morgeson, et al., 2017). Due to a lack of involvement of organizational psychologists in (studying) the robotization of work, these valuable insights are insufficiently utilized (Ghislieri et al., 2018). The current study aims to fill this void to contribute evidence for the 'sustainable' implementation of robots in the workplace.

Method & Results

We used a two-lagged quantitative survey design among logistic warehouses employees to test whether work characteristics differ significantly across similar jobs (i.e., order picking and order packing) depending on the level of robotization. At time one, the beginning of a shift, we measured work characteristics using the Work Design Questionnaire (Morgeson & Humphrey, 2006) and demographics. At time two, the end of a shift, we measured employee outcomes (e.g., boredom, well-being, meaningfulness, voice) as well as control variables such as the actual work done and robots used. In addition, managers completed a questionnaire about the level of robotization and some organizational characteristics (e.g., training, participation). Data collection among three organizations in the Netherlands is almost completed. At the SGM, the (first) results of this study will be presented.

Limitations and Implications

Experimental interventions with more objective outcome measures would be required to draw casual conclusions. Exploring the effect of robots on specific work characteristics could help organizations to mitigate the risk of poorly designed jobs after robotization.

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Bienefeld, N. & Grote, G.

Human-AI Teaming in Future Work Systems: An Analysis and Design Recommendations in the Example of Acute Care Teams

Purpose

Increasing numbers of organizations are using AI1 to automate tasks, initiate actions, and make decisions. As a result, human-technology interactions are changing in unprecedented and, to date, unpredictable ways. For instance, we do not yet know how control should best be (re)distributed between humans and AI; especially when humans—due to the increased complexity and "black-box" problem inherent in self-learning AI—can no longer understand what the AI is doing and why (Johnson & Vera, 2019).

Originality

This study is among the first to analyze important issues in human-AI teaming and to make recommendations for the design and use of AI in future work systems.

Methods

First, to analyze human-AI teaming in everyday practice, we observed 250 hours of real-time interactions between intensive care unit (ICU) physicians and nurses and *Autoventilator*2*,* an AI that automates the task of mechanical ventilation. These observations took place in seven ICUs from two hospitals across Europe and were guided by a well-established observational methodology (KOMPASS, Boos et al., 2013). Additionally, we conducted 52 semi-structured interviews with ICU physicians and nurses.

Second, to explore the distribution of control between humans and AI from a technology-centered perspective, we queried data-scientists (N = 10) by means of a Delphi survey (McKenna, 1994). Third, based on work design and socio-technical-system-theory, we propose recommendations for the design and use of AI in future work systems.

Results

Data analysis of stages two and three is still ongoing. Complete results will be reported in May 2020. Preliminary results illustrate deficiencies in process transparency, information access, flexibility and process control. For instance, people tended to overly rely on *Autoventilator* to do "*his part of the job*". Once an alarm was issued, ample time was spent looking at values or switching between computer screens to try diagnose what the AI was doing and when asked about how control should be distributed between humans and AI, one of the standard answers was "*he* [*Autoventilator*] *controls it all by himself, we just need to trust him"*.

Limitations

Although this study provides a rich qualitative data-set, we cannot posit causal relationships. Furthermore, due to the limited availability of teams that already interacting with state-of-the-art AI, our sample is somewhat small and restricted to one industry.

Implications

This study makes significant contributions to our understanding of human-AI teaming at work. Our recommendations inform the design of AI-based work systems and the technologies used therein, with the aim to improve the use of AI at work.

Conclusion

Preliminary results confirm the known risks about relinquishing control to automated systems (e.g., Grote et al., 2014). These risks can exacerbate in light of increasingly capable AI. Our propositions for a better design and use of AI at work can help retain workers' motivation, job satisfaction and—hopefully—avoid performance losses.

1 We use AI as a general term comprising *machine learning* and its various sub forms such as *deep learning* (Lecun, Bengio, & Hinton, 2015)
2 The tradename of this technology has been changed due to a non-disclosure agreement.

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Bracht, E. Misterek, C., She, Z., Hernandez-Bark, A., van Dick, R., & Junker, N.

Digital Leadership and Phubbing: Balancing Digital Enthusiasm and Digital Overuse

The core of what constitutes positive leadership did not change drastically with the arrival of the digital age during the past years. However, different from earlier times, a central challenge for today´s leaders is to deal with digital media in an appropriate way. With this study, we intend to capture, which digital leader behaviors impact follower work engagement and performance, as well as burnout. We measure digital leadership with 5 items based on typical positive leader behaviors applied to the digital context, and combine it with an existing measure of phubbing—offending others by using mobile phones in their presence. We thus explore the assumption, that besides being positive and enthusiastic regarding new technologies (digital leadership), leaders also need to know limits of digital media usage (phubbing). Building on job demands-resources theory, we argue that digital leadership can be a resource for followers, while leader phubbing behavior can be interpreted as a demand, both impacting the level of perceived support by the leader. We further suggest that perceived support by the leader serves as a mediator between digital leader behaviors and follower´s work engagement, burnout, and performance levels. To explore our model, we recruited 93 teams from a banking company in China. Digital leadership, phubbing, and perceived support rated by followers, were measured at Time 1. Work Engagement and burnout, also rated by followers, were measured four weeks later. Additionally, leaders rated their follower´s performance at Time 2. We used multilevel modeling to test our models. We found that perceived support mediated the relationship between digital leadership and work engagement, burnout, and performance. The additional moderating role of phubbing is currently being explored. Generalization of results is limited, as our sample was recruited from a single organization in China. As described in GLOBE studies, China is culturally different from Western countries, for instance with regard to power distance. A higher power distance may be associated with more tolerance towards the leader, for instance when he or she shows phubbing behavior. Hence, future studies may test a similar model in different cultures.

Key Words*:* Digital Leadership, Phubbing, Job Demands-Resources Theory

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Georganta, E. & Niess, J.

Interactive Technologies Supporting Team Effectiveness: A Systematic Literature Review

Purpose

The goal of our study is to systematically review how interactive technologies support factors and psychological mechanisms of teams in organizations, and thereby promote team effectiveness. We aim to identify promising areas for future research to purposefully integrate knowledge of team and human-computer interaction (HCI) research.

Originality

We combine team and HCI literature, which stem from different research streams, in a systematic way to respond to the call of how technology shapes teamwork and outcomes. Consequently, we identify future interdisciplinary research challenges and suggest how to build better interactive systems for teams.

Method

A systematic literature search is being conducted using PsychInfo and ACM (Association for Computer Machinery). Our search terms are team(s) or group(s), and tool(s), technology(ies) or software(s). Articles should match the following criteria: (1) peer-reviewed English-language publication; (2) focus on work teams; (3) focus on improving team effectiveness; (4) empirical study.

To code the factors and mechanisms supported by the interactive technologies, we use team effectiveness models (Ilgen, Hollenbeck, Johnson,& Jundt, 2005; Mathieu, Maynard, Rapp, & Gilson, 2008) as our theoretical framework. Specifically, we differentiate between *input* factors on the individual- team- and organizational-level, *mediators* (i.e., team processes and emergent states), and *outcomes*. Further, we code whether the interactive technologies are technology-oriented (i.e., technology action that leads to user's reaction) or user-oriented (i.e., user's action that leads to technology reaction).

Preliminary Results

So far, more than 1,000 studies from PsychInfo have gone through our selection process. From these studies, only 35 studies have remained. Some interactive tools (N = 8) support input-factors on the individual- (e.g., teamwork skills), on the team- (e.g., team composition) and on the organizational-level (e.g., support structure). Most of the interactive technologies (N = 18) support mediators, focusing mainly on transition team processes (N = 12; e.g., team communication, reflexivity). One interactive tool supports interpersonal processes (i.e., conflict management), two support action processes (i.e., monitoring), and three support emergent states (i.e., team mental model, motivation and empowerment). Further, some interactive tools support outcomes (N = 9) - quantitative (e.g., number of errors) and qualitative (e.g., quality of project). Most of the interactive technologies are user-oriented.

Limitations

Our search is restricted to work teams, although interactive technologies exist also in other contexts, such as the educational or the military.

Implications

Recent work called for building an understanding of how technologies are changing the nature of teamwork. Our preliminary results show that team technologies are often designed without taking psychological team mechanisms into account, whereas the psychologically founded design of such technologies often remains on the conceptual side. Hence, interdisciplinary future research challenges can facilitate better knowledge integration of the two disciplines.

Conclusion

Using a systematic review approach, we aim to provide first insight into the interactive technologies developed for today's work teams, identify whether they can support the underlying factors and mechanisms that promote team effectiveness, and thereby provide suggestions for future research.

Giusino, D., de Angelis, M., & Pietrantoni, L.

AI-Based Tools to Promote Mental Health and Wellbeing in the Workplace: A Systematic Overview and Theoretically Grounded Assessment of Market-Available Products and Services

Introduction

One quarter of European working population experience a workplace-related mental health problem during their lifetime (EU-OSHA, 2014), like workplace anxiety, depression symptoms, burnout syndrome, and work stress. This is not only harmful for employees' wellbeing, but it also results in higher turnover rates, absenteeism and sick leaves, lower job performance, creativity and innovation, worsened relationships with peers and supervisors, and loss of organisational productivity and image (Michaels & Greene, 2013; Von Thiele & Hasson, 2011). To tackle this issue, using app-, web- and computer-based advanced technologies to provide interventions aimed at promoting mental health and wellbeing in the workplace has proven promising (Deady et al., 2018; Ebert et al., 2016, 2017; Heber et al., 2017). However, little attempt has been made in the scientific literature to investigate solutions taking advantage of Artificial Intelligence (AI), despite several of them can already be found on the market (e.g., Cogito©, Affectiva©). The extant contributions on the topic mostly focus on employees' perceptions of potential AI benefits in reducing work accidents (Veiga & Pires, 2018), chatbots development for digital counselling programmes (Cameron et al., 2017), and machine-learned modelling of work stress for detection by wearable physiological sensors (Hagad, Moriyama, Fukui, & Numao, 2016; Sandulescu, Andrews, Ellis, Bellotto, & Martínez Mozos, 2015; Wanka, Psihoda, Planinc, & Kampel, 2015).

Purpose

The current study aims to take the first step towards the systematisation of AI-based products and services available on the market to promote workplace mental health and wellbeing. A process of collecting and screening products and services is carried out to map the available tools and their potential organisational impact.

Originality

To the best of authors' knowledge, the study is the first one pursuing the stated purpose.

Method/design

Due to paucity of academic literature on the matter, a review approach using non-academic informational sources is proposed. Retrieved results are thoroughly screened to collect information about the currently available AI-based products and services addressing workplace mental health.

Results

Based on gathered data, the identified tools are classified and compared according to a set of descriptive criteria, such as Technology Readiness Level (NASA, 2017), type of AI usage (e.g., AI-based, AI-assisted), type of offered service (e.g., assessment, intervention), level of prevention (primary, secondary, tertiary), level of assessment/intervention (individual, team, leader, organisation; Nielsen, Yarker, Munir, & Bültmann, 2018), main AI function (e.g., natural language processing, facial recognition), potential innovation and targeted workplace mental health dimensions (e.g., stress, depression), factors (e.g., negative exposure to customers) and outcomes (e.g., wellbeing, performance). An expert assessment of the products and services is subsequently conducted based on theoretical knowledge and empirical results from workplace mental health literature.

Limitations

The study design not aiming to collect empirical evidences prevent from drawing strong conclusions about solutions' effectiveness.

Implications/Conclusion

The study advances the domain of AI and organisational wellbeing by highlighting open questions, needs for further investigation, and providing a reference framework for future empirical research. Achieved results will be used within the EU-funded H2020 project XXX[1] to design innovative implementation activities tackling workplace mental health.

[1] Note from organising committee Frankfurt (Anna & Sonja): XXX = blinded for review

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Gotcheva, N., Hallamaa, J., Kalliokoski, T., & Leikas, J.

Exploring Ethical Issues Arising from the Introduction of Artificial Technologies into the Society

Advances in artificial intelligence (AI) have the potential to change significantly our world. According to the EU guidelines on ethics in AI (2019), AI refers to "systems that display intelligent behavior by analyzing their environment and taking actions – with some degree of autonomy – to achieve specific goals." AI technologies have been spreading into the fabric of nearly all fields of activity from health care systems to financial institutions, and from public policy and governance to autonomous vehicles and social media. Large corporations have launched programs, such as Microsoft's "AI for Good" with high-level aims for "providing technology, resources and expertise to empower those working to solve humanitarian issues and create a more sustainable and accessible world". Nevertheless, how such initiatives could be realized in practice remains an open question. Despite the increasing interest in studying ethical concerns, coming out from deployment of intelligent technologies in various contexts (e.g. Wangmo et al., 2019), common naming of ethical issues does not necessarily imply a unified interpretation of their meaning, or indicate a method to resolve conflicts between ethical principles.

The study is part of XXX[1] project "Ethical AI for the Governance of the Society", funded by XXX[2]. We ask what ethical issues emerge from the introduction of AI into the Finnish society, and how they can be interpreted. The originality of our study stems from the fact that unlike most AI ethics studies, we do not take a list of ethical principles as our starting point but scrutinize the AI assisted systems as cooperative processes.
Furthermore, our approach uniquely combines foresight, social ethics and philosophy. Our framework is philosophy of action and cooperation, according to which every goal expresses a value statement. We conceptualize cooperative complexes that include both humans and artificial agents as Multiple Agent Systems (Misselhorn, 2015). We collect data by horizon scanning, future workshops and semi-structured qualitative interviews with experts who represent various public authorities and other professionals. We expect our approach to result in detecting a range of ethical issues, seen from cooperative perspective, which will advance further conceptualizations and practical implications in regard to ethical AI in society.

Our study focuses on the Finnish work life context. Future research could cover other country specific contexts to allow comparative analysis of ethical issues in different AI-enriched environments. The study brings important feedback to technology developers for raising awareness about the ethical needs of their potential end users and the larger society. Furthermore, the results will assist public authorities in their decision-making regarding technology development and mechanisms for ethically aligned monitoring of its short-term and long-term consequences.

[1+2] Note from organising committee Frankfurt (Anna & Sonja): XXX = blinded for review

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Höddinghaus, M., Sondern, D., & Hertel, G.

Automated Leadership: Do People Trust Decision Algorithms?

Purpose

Organizations increasingly automate decision-making in leadership contexts. As consequence, computers evolve from their previous role as tools to decision makers. To date, we know little about employee reactions to automated leadership decisions. However, reactions to and perceptions of computer-based leadership decisions potentially influence employees' acceptance and subsequent behavior. In particular, trust in the decision agent should be a key acceptance factor of automated leadership, given the relevance of trust in leadership contexts and human-computer interactions. To advance the understanding of psychological reactions to and perceptions of automated leadership, we compared participants' responses to automated and human leadership decisions. Based on inherent characteristics of decision agents and the integrative model of trust (Mayer, Davis, & Schoorman, 1995), we expected agents to differ regarding their perceived trustworthiness attributes. Additionally, we assumed that trust emerges depending on perceived trustworthiness and influences participants' reactions to the decision.

Originality

The present study is one of the first addressing employees' reactions towards human versus automated decisions in the leadership context. Thereby, we respond to recent developments and calls for more research in this emerging and fascinating field.

Method

We conducted an experimental vignette study using a 2 x 2 design with type of decision agent (computer vs. human) as within-subject factor and type of decision subject (disciplinary vs. mentoring) as between-subject factor. 333 participants read two text-based vignettes one after the other and answered questionnaires measuring trustworthiness of and trust in the decision agent, and various outcomes following each vignette.

Results

We tested our hypotheses with multiple linear mixed models. Findings revealed that participants perceived computer agents to be more transparent and of higher, whereas they perceived human agents as more adaptable and benevolent. Surprisingly, there were no differences between automated and human decision agents in the perceived ability to process decision-relevant data. Moreover, all five trustworthiness components significantly predicted trust. We also found a significant interaction effect for integrity and decision subject. For disciplinary decisions, integrity perceptions had a stronger positive effect on trust as compared to a mentoring decision. There were no interaction effects for the remaining trustworthiness factors. Finally, results indicated that trust in the agent was positively associated with the assessed outcomes.

Limitations.

Experimental vignette methodology limits external validity and reduces generalizability of our results, because scenarios only provide an approximation of real-world experiences. However, our approach allowed us to test our hypotheses in a highly controlled setting allowing causal inferences.

Implications and conclusion

Given the advancing prevalence of algorithms in managerial decision-making, we need to understand how people perceive and respond to automated leadership. Our results emphasize the importance of decision agents' perceived trustworthiness and the resulting trust in both human and computer agents, identifying trust as a key factor for the acceptance and success of automated leadership. Hence, a careful consideration of our results both in the actual implementation and the communication of automated leadership to employees can assist practitioners in building efficient workplaces, while ensuring that employees can trust in and feel good about automated leadership.

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Jakubowitz, T., Oeste, S., & von der Weth, R.

Agent-based Modelling as a Method for Prospective Work Design

Digitization is changing the world of work permanently. New technologies lead to changed work processes, which also place other demands and strains on working people. An agent-based simulation tool is being developed to assess the effects of introducing new technologies on future workplaces and analyses the effects on human well-being.

Within the ECSEL project iDev40, the HTW Dresden[1] in cooperation with the project partners investigates the effects of the special organization and technology of intelligent production systems on the human handling of complex problems as well as on motivation and learning. For the semiconductor industry to remain competitive, future highly automated production systems and value chains need the capability to autonomously adapt to new requirements, to learn new behavior and to solve future complex problems. Therefore, employees will change their role in sociotechnical systems.

In order to achieve an adequate understanding of this highly networked process, a computer-based method for the dynamic simulation of these effects on humans is to be developed. This method will be used to support project partners at the design and evaluation of the work system.

A new simulation-based tool for work system analysis is in development, which allows to assess human-computer-interaction in future work systems regarding complexity, opaqueness, interrelatedness and dynamics and their influence on problem solving, innovative behavior and learning. The analysis is based on simulated demands and strains of the modeled workplace.

The aim of the tool is to be flexibly applicable for any kind of workstation. Therefore, the goal is to adopt a modular structure so that the core functionality can also be used for other research questions and areas. For example, in another research project, the simulation is used in a serious game to raise awareness of the consequences of digitization.

The simulation is based on a model of workplaces as a socio-technical system. This model was developed based on a literature study and calibrated by experimental data. Components of this model are the working environment with all work objects and means of work as well as objective requirements and personal performance prerequisites of workers. With this model a working day can be simulated and based on the resulting data a work analysis can be conducted. This enables a prospective analysis of expected changes in the workplace and the demands made on employees.

How agent-based simulations are used as a tool for the conception and design of workplaces in chip production is presented. In addition, an outlook on further practical fields of application of simulation in work science is given.

[1] Note from organising committee: the name of the project and university were blinded for review

Jungst, M.

Advanced Technologies and Team Dynamics

The introduction of advanced communication technologies encourages organizations to make use of virtual teams to increase organizational performance within a global environment (Handke, Schulte, Schneider, & Kauffeld, 2019; Raghuram, Hill, Gibbs, & Maruping, 2019). Virtual teams are defined as: "(a) two or more persons who (b) collaborate interactively to achieve common goals, while (c) at least one of the team members works at a different location, organization, or at a different time so that (d) communication and coordination is predominantly based on advanced electronic communication media" (Hertel, Geister, & Konradt, 2005, p. 71). One important challenge of virtual teams is to manage interpersonal team processes (Breuer, Hüffmeier, & Hertel, 2016). Therefore, the present study uses a dynamic social network approach to investigate the relationship between interpersonal team processes and individual and team performance. By investigating a dynamic structural perspective of interpersonal team processes, we hope to answer a recent call to enhance our understanding of interpersonal processes within virtual teams (Maynard, Mathieu, Gilson, Sanchez, & Dean, 2019). Second, we propose that the effect of interpersonal team processes on both individual and team performance depends on the degree of team virtuality.

The study required participants to complete a diary questionnaire every week for four weeks and a survey questionnaire at the start. Data were gathered from 392 (representing 107 teams) participants. The data contained a hierarchical structure in which weekly episodes were nested within participants and the participants were nested within teams.

Our primary contributions rest in the exploration of an episodic perspective of interpersonal processes within virtual teams (Marks, Mathieu, & Zaccaro, 2001). We found that interpersonal team processes, in the form of network structures, fluctuate from week-to-week. As such, our study offers a novel and important insight that interpersonal team processes might change multidirectional over time. Our findings also suggest that teams with high levels of team virtuality make more use of advanced technologies to collaborate, deriving less instrumental value from interpersonal team processes. Based on these results, we recommend managers to develop guidelines which include how to communicate effectively while using advanced technologies (Hill & Bartol, 2018).

One limitation has to do with the within-team research design, which limits the possibility to test causal relationships. In this article, network structures act as an antecedent of both individual and team performance. Although this is in line with the social network theory (Burt, 2009; Granovetter, 1985; Lin, 2002), it is possible that the opposite also holds, for example, higher individual performance increases the development of network structures. A second limitation arises from the fact that we investigated interpersonal relationships in the form of instrumental ties. Yet, we acknowledge that different types of ties exist within teams (Labianca & Brass, 2006).

The insights form our research are the results of bringing together two previously disconnected research perspectives of dynamic social networks and virtual teams, to explore the moderating role of team virtuality on the positive consequences of social structures over time.

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Kubicek, B. & Marx, C.

The Impact of Positive and Negative Feedback from a Humanoid Robot on Individual's Self-Esteem in a Performance Situation

Purpose
With the technological advances in robotics, it is envisioned that humans will increasingly find themselves in work contexts in which they work collaboratively with robots or other AI, even in knowledge work. This development raises questions not only on the augmentation of human work by intelligent systems (Davenport & Kirby, 2016) but also on psychological implications of human-robot interactions, such as the impact of humanoid robots on human self-esteem. Hence, we investigate the effect of positive and negative feedback from a humanoid robot on human self-esteem in a situation where performance can hardly be assessed by the human themselves.

Originality
While trust in and acceptance of robots is often investigated, other psychological impacts of human-robot interactions are rarely addressed. Yet, to fully understand the impact of introducing humanoid robots in the work context, we need to better understand whether and how robots affect individuals needs and self-perception.

Method/Design
We currently conduct an experiment with positive/negative feedback as a within-subjects factor and human versus robot agent as between-subjects factor. Participants either interact with a human or with the Pepper robot designed by Softbank robotics. Pepper is a humanoid robot with a collection of integrated sensors for safe interaction with humans. After conducting the n-back task, participants receive either positive or negative feedback from the human/robot agent. Then, self-esteem is assessed with the Rosenberg self-esteem scale (Rosenberg, 1965). Since prior research demonstrates that positive/negative feedback has a moderate effect on self-esteem, we aim for a sample of 80 participants.

Results
Since this is an ongoing study, we are not yet able to provide results, but will be by end of May, when the SGM takes place.

Limitations
As may be criticized in research on human-robot interaction in general, we investigate the impact of robots' behavior on humans' self-esteem in a laboratory setting. This raises concerns about the ecological validity and the generalizability of the results. Yet, since humanoid robots are still scarcely employed in work contexts, our research approach is justified.

Implications.
The results have implications for the effective and responsible development of social robots in the work context. They also shed light on whether robots can act as social surrogates that fulfill human needs for belonging and impact human self-esteem. Hence, the research adds to theory

on the social impact of robots and on whether humans react socially to technologies (Reeves & Nass, 1996; Coeckelbergh, 2012).

Conclusion

Conclusions will be drawn.

Langer, M., König, C. & Busch, V.

Trust in Automation for Managerial Decisions: Differential Trust Violation and Trust Repair Effects between Human and Automated Decision-Support

Purpose
To support decision-making in management, various automated systems have evolved. This is especially true for human resource management, where organizations use such systems to enhance decision quality and efficiency (e.g., through automatic applicant screening). Trust in the decision-support agent is central to improve efficiency as it decreases necessary capacities to supervise the decision-support agent. Previous research suggests that trustworthiness evaluations and trust building processes for interpersonal trust and trust in automation differ. However, there is a lack of research providing insight on a) differences in the facets of trustworthiness (e.g., ability, transparency), b) trust processes over time in relation to automated decision-support (trust building, violation, repair), and c) trust in automation for managerial decisions which add novel social and ethical components to trust in automation. This study sheds light on differential reactions in trust processes regarding human compared to automated decision-support when there is a trust violation in an applicant screening process.

Originality
This is the first study to compare trustworthiness facets for human versus automated decision-support for managerial decision tasks over time.

Method
In a 2x2 (human vs. automated system; no information vs. imperfection information) online experiment, participants (N = 113) performed 12 rounds of a personnel selection task. Participants were informed that an automated system (a human colleague) assists them. In the imperfection condition, participants received information that the assisting agent is not perfect. In each round, participants saw a recommendation regarding a preselection of a subset of applicants. Starting in round five, the preselection predominantly included male applicants (i.e., a trust violation happens in a way that diversity of the preselection is not given). In round nine, participants received a trust repair intervention (i.e. an excuse for the biased preselection). We measured participants evaluation of trustworthiness (ability, transparency, flexibility, objectivity, and benevolence) of the decision-support agent, trust in the agent, and if participants are willing to use the preselection.

Results
Trust in the human decision-support was generally higher. Regarding trustworthiness participants perceived the human support as initially more able, and flexible, benevolent but less objective. The trust violation and trust repair manipulation more heavily impacted trustworthiness evaluations of the human compared to trustworthiness evaluations of the system. For instance, the biased preselection did not affect evaluations of objectivity and flexibility of automated decision-support. There were negligible effects for willingness to use the recommendation and the imperfection manipulation.

Limitations

The tasks were no real personnel selection tasks and participants no hiring managers.

Implications

Similar to classical trust in automation research we found that trust processes for humans and automation differ. However, whereas previous literature on classical automation tasks has found that trust in automation starts on a higher level, we found for a managerial task (i.e., personnel selection) that trust in automation starts on a comparably lower level. Additionally, trust violations and repair interventions seem to be more salient and influential for human decision-support.

Conclusion

Findings for trust in automation in classical automation tasks cannot be directly transferred to trust processes in relation to automation in management.

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Plomp, J. & Peeters, M. C. W.

For Better or for Worse:
The Impact of RPA Technology on Work Characteristics and Well-being – Consequences of Advanced Technologies at Work

Purpose

An emerging issue that plays a large role in the future of work is the increasing digitization of work processes. One of the key challenges is to safeguard a motivating and healthy work environment for employees who have to work on a daily basis with new technologies. The current study aims to uncover how the implementation of a new technology affects relevant job demands (i.e., information processing and perceived job insecurity) and job resources (i.e., autonomy and task variety). In turn, we investigate how these job characteristics relate to employee well-being (i.e., work engagement and exhaustion).

Originality

So far, research on the impact of new technologies on the (future) quantity of work is becoming more prevalent. Yet, relatively little is known about the impact of digital technologies on the experienced quality of work of employees. Examining the consequences of working with a technological innovation on employee work experiences is of great importance, considering that a healthy and motivated workforce is more likely to attain performance goals and increase overall organizational productivity. Drawing on the Job Demands-Resources framework, we propose a model in which the use of a new technological system relates to autonomy and task variety (job resources), as well as information processing and job insecurity (job demands). In turn, we hypothesize a positive relationship between job resources and work engagement and a negative relationship between job demands and exhaustion.

Method

We collected data among employees working within a department of a large ministry of the Dutch government by means of a cross-sectional online survey (N = 268). This particular department recently introduced RPA (Robotic Process Automation) technology, which mimics employee actions and takes over repetitive computer tasks. We distinguished between employees who did not (yet) work with this new system (N = 196) and those who did work with the new technology (N = 72).

Results

The results of structural equation modeling showed that system use was negatively related to autonomy and task variety, which in turn were both positively related to work engagement. Additionally, system use was negatively related to information processing an and positively associated with job insecurity. Only job insecurity was found to be positively related to exhaustion. Furthermore, the indirect effect of system use and work engagement through job resources was significant.

Limitations

A first limitation is that this study is based on self-reports, which can cause the problem of common method variance. A second potential limitation concerns that we only measured post-implementation and consequently could not control for baseline measurements before the implementation of the new technology.

Implications and conclusion

Our findings indicate that employees who recently have been introduced to a new technology, experience a substantial loss of job resources and job security. Moreover, when job resources and job security decrease, this negatively affects employee well- being. Organizations should carefully take into account potential job characteristics that are likely to be affected by a new technology and provide workers with sufficient resources to cope with these changes following a technological innovation.

Wesche, J., Quade, J., Kollhed, C. & Kluge, S.

Individuals' Reactions to Selection Decisions by Human vs. Algorithmic Decision-Makers: Two Experiments on Individuals' Trust and Acceptance

Purpose

With the tremendous progress in artificial intelligence and machine learning, new applications of automation are nowadays available to organizations that allow to automate decision-making processes that were previously carried out by humans (e.g., Parker & Grote, in press). Especially in personnel selection, practical applications of these new forms of automation are booming, having organizations around the globe making use of it, going from digitized, computer-mediated forms of recruiting (e-recruiting, Stone et al., 2015) to algorithmic forms of recruiting (e.g., AI recruiting, van Esch et al., 2019). However, while applicants in e-recruiting still interact with human decision-makers, in algorithmic recruiting they place themselves in the decision-making power of algorithms and thus in a fundamentally different role than humans as users or consumers of technology (Lee, 2018; Wesche & Sonderegger, 2019).

Originality

Prior research suggests that the nature of the decision-maker (human vs. algorithmic, e.g., Ötting & Maier, 2018) and transparency of decision-criteria (e.g., Ingold et al., 2016) are relevant factors for applicants' reactions to selection procedures. Moreover, algorithmic decision-making was found to be more acceptable for decisions requiring mechanical vs. human skills (Lee, 2018). Combining these three factors, we conducted two experiments to explore individuals' reactions to algorithmic selection decisions: one scenario-based study (**S1**, $N = 272$) and one preregistered study (**S2**, $N = 183$), where participants actually performed an application process.

Method/ Design

In **S1**, participants were asked to put themselves in the position of employees who receive the decision about their selection for an attractive development program. In a *2x2 between-subject design*, we manipulated the decision-maker (human vs. algorithmic) and the transparency of decision-criteria (transparent vs. not). Participants reported their trust and acceptance both with regard to the decision-maker and the decision-result. In **S2**, participants were invited to take part in a selection procedure to qualify for an attractive main study. In a *2x2x2 between-subject design*, we manipulated again the decision-maker (human vs. algorithmic) and the transparency of decision-criteria (transparent vs. not) and in addition the nature of selection tests (logical reasoning vs. creativity). Participants reported their responses equivalently to S1.

Results

MANOVA-results for S1 showed significant main effects of the decision-maker as well as of transparency of the decision-criteria on the three dependent variables, such that trust and acceptance of the decision-maker and the decision-result were higher in the human decision-maker condition (compared to the algorithmic decision-maker) and in the transparent condition (compared to the non-transparent). No significant interaction of the two factors was found. Initial MANOVA-results for S2 suggest significant main effects of the decision-maker, but not of transparency, the nature of selection test or interactions between the factors on the three dependent variables.

Limitations

The results of our experiments have to be interpreted with caution, as the use of hypothetical scenarios (S1) and a non-work context (S2) limit their validity.

Implications/Conclusion

Our results suggest that using algorithmic instead of human decision-makers negatively impacts individuals' trust and acceptance regarding personnel selection processes. Advantages and disadvantages of human vs. algorithmic selection procedures at work will be discussed.

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Zeyda, M., Stracke, S., Knipfer, K. & Gloor, P. A.

When Your Body Tells More Than Words: Predicting Perceived Meeting Productivity Through Body Signals

Purpose
Team meetings are an essential part of everyday work life. Considering the huge amount of time that employees spend in meetings, it is important to determine whether they perceive the meeting procedure and outcomes as productive or not. Hence, meeting productivity is a key variable in meeting research. The aim of this study was to explore the potential of advanced technologies in predicting meeting productivity from body signals.

Originality
Previous research has mostly investigated factors such as meeting design and conversations before or during the meeting to draw inferences about meeting productivity, or subjective post-hoc evaluations of meeting productivity were gathered from participants. With this research, we took a novel approach: Specifically, we investigated whether body signals such as heart rate, arm movement, and speech intensity can be accurate indicators of perceived meeting productivity.

Methods
In a total of 26 meetings, we used smartwatches to track heart rate, arm movement, and speech intensity of 71 participants during the whole meeting. At the end of each meeting, participants rated perceived meeting productivity on a scale ranging from zero to 100 on the smartwatch display.

Results
Using multilevel linear regression analysis, we predicted perceived meeting productivity from body signals. Our results showed that variance in arm acceleration was a significant predictor of perceived meeting productivity. In a second step, we used a Random Forest Classifier in Machine Learning to predict perceived meeting productivity. A 4-fold cross validation revealed that body signals can accurately predict meeting productivity in roughly 60% of the cases. Again, arm acceleration was the most important factor in classifying our data.

Limitations
As we were not allowed to use a unique identifier for each participant, it was not possible to control for between-person variability. Still, this study allows us to get a first idea on the role of body signals in predicting perceived meeting productivity.

Implications
This study adds to previous work on meeting effectiveness by tapping into the potential of wearables to provide valid information about meeting productivity. We showed that wearables provide valuable information about participants' perceived meeting productivity only based on their body signals and without recording potentially sensitive conversation content. Our

research further implies that we can measure meeting productivity accurately by using real-time sensor data instead of gathering post-hoc evaluations from meeting participants.

Conclusion

As advanced technologies, such as smartwatches, are increasingly becoming part of our everyday work life, it is crucial to better understand how they can be used for improving both research and practice. Our research may lay the groundwork for designing feedback interventions based on sensor data gathered during meetings to raise awareness about meeting (un-)productivity. Ultimately, sensor data gathered by means of wearables may be used to reduce the time we spend in unproductive meetings.