Exclusion and inclusion through a discourse of equality – positioning the blue-collar worker in Industry 4.0

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Abstract

Blue-collar steel industry workers have traditionally been engaged in hard, physical, manual labour, but with the transformation of Industry 4.0, the need for manual human labour is reduced. In this article we explore the consequences of this transformation for the constructions of discursive positioning of the blue-collar worker. Analysing the material from 89 interviews from five steel companies in Sweden we analyse the the linguistic constructions of concept: what the blue-collar worker is and might become in Industry 4.0, and the consequences this concept has for the blue-collar worker as object: who the blue-collar worker is, and who (s)he is not. This shows that blue-collar workers are constructed as skilled and equal to white-collar workers, but also as deskilled and standardized.

Furthermore, inclusion into this equal and standardized workforce is constructed as being based on abilities and experiences that are only shared by a fragment of the population; the young, well-versed, socially skilled, and fast learners, with permanent contracts. The study contributes with an understanding of how social polarization is taking place in contemporary industry and points to the need for management, labour unions and to take the constructions of social inclusion and exclusion in daily interactions in the workplace seriously, in order for the development towards an innovative, human-centric Industry 5.0 to become just and fair.

Keywords: blue-collar workers; Industry 4.0; upskilling; deskilling; equality

Introduction

Since the early 20th century, the distinction between "blue-collar" (dressed in chambray, dungaree or denim) and "white-collar" (dressed in white shirts) workers have been made between workers performing manual labour and workers performing clerical and administrative tasks (Wikman, 2012). Unlike white-collar work, blue-collar labour is traditionally performed in high-risk, dirty work environments (Lucas & Buzzanell, 2004) and blue-collar workers are commonly seen to constitute a vulnerable group in the industrial context (Lucas, 2006; Thomas, 1989). In addition, blue-collar workers have long occupied a subordinate hierarchal position in the organisation, under the close supervision of foremen and/or mechanical controls (Ashforth & Kreiner, 1999; Lucas & Buzzanell, 2004; Thomas, 1989). This position of the blue-collar worker is, however, changing with the development of automation technologies within that which has become known as Industry 4.0.

Industry 4.0 was coined in 2014 by the German government as part of a federal strategic action plan (Bundesministerium für bildung und Forschung, 2014) but has since spread to more broadly denote the development of a 'smart' factory where routinized work is automized by connecting machines and systems, improving quality by minimizing human labour and human error. Industry 4.0 involves the adoption of advanced ICTs, such as robots and AI, which are implemented with the purpose of increasing efficiency and productivity (Autor et al., 2003; Herzog et al., 2017; Xu et al., 2018).

It has been argued that the emergence of Industry 4.0 will change the organisation and nature of work, requiring workers to adopt new skill sets (Habraken & Bondarouk, 2017), in a way that will have major consequences for skills development (Acemoglu, 2002; Acemoglu & Restrepo, 2017; Brynjolfsson & McAfee, 2014). Previous research has described how the implementation of new technologies has led to processes of alienation and deskilling (Braverman, 1974; Haakestad & Friberg, 2020), and to a development of skills-polarization on the labour market (Martinaitis et al., 2021) with effects on workplace inequality (Baxter & Wallace, 2009; Schaupp, 2022).

Others claim that the use of technologies in various industrial settings is explored mainly as a matter of organisational effectiveness and employee performance, where the social effects on equity, diversity and inclusion has been limited to consequences of the tools themselves, and that further studies are needed to "understand how employees perceive and behave in response to technological advancements" (Budhwar et al., 2022, p 1087). To advance such knowledge, studies on the use of discourses in organisational settings are promising, since individuals through language can adopt and resist positions that construct them as included or excluded in certain societal contexts (Wetherell & Potter, 1993). Previous research in this journal has pointed to a need for critical discourse studies exploring embedded conflicts and the effects on humans in the Industry 4.0-transformation (Johansson & Abrahamsson, 2021, p. 194). To amend this, the purpose of this study is to examine how blue-collar workers are discursively repositioned in the transition towards Industry 4.0.

Drawing on a large interview study in five Swedish steel companies, the article sheds light on the discursive mechanisms that construct workers as included or excluded in Industry 4.0. By contributing to the understanding of the discourses that reposition the blue-collar workers in the contemporary industrial setting, the study contributes with an understanding of how social polarization (Martinaitis et al., 2021) is taking place through the use of discourse. The conclusion is that management, labour unions and policymakers need to take the constructions of social inclusion and exclusion in daily interactions in the workplace seriously, in order for the digital development in industry to evolve just and fairly.

The debate on deskilling and upskilling, the polarization of skills and consequences for (in)equality

In the contemporary implementation of new technologies in the transformation towards Industry 4.0, historical social relations in the industry are challenged and renegotiated through parallel ideals of workers' deskilling and upskilling (Abrahamsson & Johansson, 2006). The concepts of *deskilling* and *upskilling* has a long history within the study of labour and relates to the question of if and how the skills of the worker changes with the implementation of new technology. Seminal here is the work of Braverman (1974) who argued that the implementation of new technology leads to de-skilling among blue-collar workers and therefore to an alienation from work. This, according to Braverman leaves the blue-collar worker in an even more vulnerable position than previously since he (sic) is made replaceable. More recently, the deskilling trend is predicted to lead to job losses on a large scale, as routinized manual labour is replaced by automated digital technologies (Pfeiffer & Suphan, 2015). With this development, skills related to craft work will no longer be needed or appreciated in the workplace (Haakestad & Friberg, 2020), which must be presumed as likely to have effect on the collective of blue-collar employees in the metal industry.

Other seminal works, however, counter the deskilling claims and plead for higher skills demands on industrial workers (Blauner, 1964). Scholars argue that the implementation of new technology does, in fact, lead to upskilling, as well as to increased autonomy for workers (Acemoglu, 2002; Acemoglu & Autor, 2011; Machin, 2001). The complexity of skilling in relation to implementations of artificial intelligence (AI) in industry is stated by Jaiswal et al. (2022, p. 1184, p. 1184) as "individuals need to be adept in various skills such as social, emotional, technological and physical skills to exhibit good performance or demonstrate appropriate behaviour depending upon the context or situation", in order to "remain employable and competitive" (p. 1185) on the labour market in general. The World Economic Forum specifies that the need for upskilling in the Mining and Metals industry as related to Big Data Analytics, Cloud computing, robotisation and the Internet of Things (Schwab & Zahidi, 2020). These studies confirm the need for upskilling in areas such as critical thinking, complex cognitive problem-solving, self-management, and data analysis learning skills (Jaiswal et al., 2022; Schwab & Zahidi, 2020).

Whereas less skilled workers seem to become less in-demand with the advancement of new technology, highly skilled workers seem to become more attractive (Acemoglu, 2002). This leads to what has been called the *polarization of skills*, i.e. an increased polarization between highly skilled and deskilled workers. Goos et al. (2014) describe this development as the result of machines taking over mid-skilled occupations, constructing a skills' void among workers, leading to wage polarization, and more generally changing the conditions for employment. The phenomena of skills-polarisation are especially noted in the Nordic countries where industry has undergone rapid technological change during the past few decades (Adermon & Gustavsson, 2015; Asplund et al., 2011).

As companies in the transformation towards Industry 4.0 workplaces grapple for skilled, innovative and creative talents, the social effects of the polarization of skills in the industrial process towards Industry 4.0 is an urgent matter. We know that the development of new technologies may be understood as driving agents of economic and social inequalities in society at large (e.g. Peters, 2013) and that technology in itself is "created, harnessed and reproduced" through societal drivers of power (Spencer, 2017, p. 145). Extant research furthermore shows that polarization of labour is changing relational prerequisites between different groups, hereby challenging the quest for what has been called the 'inclusion turn' (Adamson et al., 2021) in organisations. Hence, it may be argued that everyday practices and use of discourses in skills demands *seem* neutral and non-exclusionary, but that they in reality operate *against* inclusion (Dobusch, 2021; Nkomo, 2013). But how does this happen? To unpack "the processes and dynamics related to issues of inequality in blue-collar workplaces" (Lønsmann & Kraft, 2017, p. 146), a focus on language use provides a promising avenue, since a close focus on discursive constructions allows for a problematization of common understandings of technological change (Abrahamsson & Johansson, 2021; Pfeiffer & Suphan, 2015).

Theoretical and analytical approach

As humans use language in everyday conversations as a way to make sense of their experiences, paying attention to language-use makes it possible to understand how their selves are constructed (Edwards & Potter, 1992; Wetherell & Potter, 1993). Here, we mobilize the theoretical notion of *subject positioning*, as used in discursive psychology (Wetherell, 1998). Subject positioning is closely related to ideas of personality or identity. However, as stated by Parker (2015, p. 130) "This is where we can connect with a wider critical approach to the discipline [of psychology], for we treat the variety of things that psychologists tell us they have found inside us and among us as forms of discourse." This means that when describing experiences, skills, or traits, as normal, desirable, abnormal, or undesirable such statements can be explored as discursive constructions embedded in both a specific organisational as well as wider Western culture. The linguistic constructions of humans in

text and talk can thus be understood as "a particular 'regime of truth' which makes our talk and experience about 'the self', 'personality' and 'attitudes' make sense." (Parker, 2015, p 132) in the particular time, place and context. Context here is thus viewed as multi-layered, contestable, locally achieved and co-created through ongoing human interaction (Fairhurst, 2009). This makes discursive positioning a suitable analytical framework when aiming at understanding the consequences of one-on-one conversations, such as interview settings, for larger social contexts, since the positioning process does not merely say something about the (interviewed) individual but enables the analysis of larger societal processes (Harré & Moghaddam, 2003). Finally, unlike other discursive theories, discursive psychology recognizes individual agency by emphasizing that even if the social context stipulates certain positions as those are that are available, individuals can still select them deliberately – or not – and thus resistance towards social change is possible (Harré & Moghaddam, 2003; Wetherell & Potter, 1988, 1993; Parker, 2015).

Subject positioning posits that the qualities of subjects (individuals/groups of individuals) are brought about through the discursive locating of individuals within a set of linguistic repertoires (Wetherell, 1998). It should be noted that a *subject* here is not to be understood as denoting a fixed identity. Instead, subjects are undergoing a constant process of becoming constituted and reconstituted through the use of the discursive repertoire that are available.

Discursive repertoires are used in human interaction to produce how a role, a group or how individuals within such a group should be or become. Through interaction we can discuss, debate and agree on a *concept* that can be used to speculate how this role, group or individual should be, behave, know or act (Phillips & Hardy, 1997). Furthermore, through this interactive process of defining the *concept*, individuals as *objects* become included or excluded in particular ways, which then also means that some people are constructed as not belonging to the particular group of individuals that are objected to the repertoire mobilized. In the realm of discursive psychology, Parker (2015) describes the matter of *object* in two different ways: either as a matter of reality, i.e. that language refers to an object by the use of a noun (a cat, a blue-collar worker), or as something that is constantly given new meaning through discourse. In this later case, our analysis rests on the notion of discourses as objects. A further way to approach the matter of subject-object is that "The object that a discourse refers to may have an independent reality outside discourse but is given *another* reality by discourse. An example of such an object is the subject who speaks, writes, hears, or reads the texts where discourses live." (Parker, 2015, p. 158, italics in original). To conclude, the subject positioning of the blue-collar worker in Industry 4.0 is explored through the linguistic construction of *concept* (Phillips & Hardy, 1997) – what the blue-collar worker is and might become, and the consequences for the blue-collar worker as *object* (Parker, 2015): who the blue-collar worker is, and who (s)he is not.

Study design

The study was part of a larger 1-year research project, the Digitalized Work and Organisation (DAO) project where ten researchers (the authors plus additional colleagues), performed interviews at seven Swedish steel companies. For this article, five companies were selected since they (companies A-E in Table 1) represent a cross-section of the Swedish steel industry with regards of production processes, with in total 89 semi-structured interviews[1]. Most respondents were men, which reflects the gender structure of the industry at large. The ages of the respondents varied from 26 to 65.

Table 1. Characteristics of the companies studied

	Production process	Type of product	Degree of automation/digitalization	Number of interviews, female (F) and male (M)
Company A	Flow	Raw material	Mainly manual and automated units	21 (4 F, 17 M)
Respondents' roles: 12 operators (incl. 1 local union representative), 4 production managers, 1 technician, 1 head of production, 1 head of logistics, 1 HR manager, 1 CEO				
Company B	Batch	Manufacturing	Mainly robotized units	20 (4 F, 16 M)
Respondents' roles: 11 operators (incl. 1 local union representative and 3 with shift manager responsibilities), 3 technicians, 1 production technology manager, 1 production unit manager, 1 site manager, 1 product manager, 1 HR business partner, 1 IT site operations manager				
Company C	Flow	Raw material	Units that are manual, automated and robotized	13 (4 F, 9 M)
Respondents' roles: 9 operators (incl. 1 local union representative), 1 HR administrator, 1 technology manager, 1 head of operations, 1 HR director				
Company D	Production maintenance	Raw material	Units that are manual, automated and robotized	11 (1 F, 10 M)
Respondents' roles: 1 operator and local union representative, 2 technicians, 4 technology coordinators, 2 maintenance managers, 1 section manager, 1 HR partner				
Company E	Batch	Raw material	Units that are manual, automated and robotized	24 (4 F, 20 M)
Respondents' roles: 15 operators (incl. 2 local union representatives), 3 production managers, 2 flow managers, 2 unit managers, 1 technician, 1 HR manager				

Workers, engineers and management share historical memories of organisational and technical change, blurring the boundaries between professional identity and organisational memory within an industry (McLachlan et al., 2019). Therefore, interviews were performed across the companies with blue-collar workers (entitled 'operators' or technicians), HR-professionals, on-site union representatives and managers at various levels. All interviews were recorded and subsequently transcribed. The variation within the empirical context strengthens the transferability to other contexts (Larsson, 2009). In the *findings* section below, respondents from all five companies are represented.

Without neglecting the risk of imbalanced and complex power relations between researchers and informants (Merriam et al., 2001), when approaching respondents we explicitly presented ourselves as outsiders, not paid by, or following orders from management in the particular industry, in order to gain trust from workers who might have been less informed about the research project taking place (e.g. Lønsmann, 2016; Lønsmann & Kraft, 2017, p. 145).

For the interviews a common template was used with the themes (with corresponding keywords): *Work* (work tasks; competence; requirements for a good job; change; future; relationships within the team); *Culture* (a good employee; the climate; influence; the feeling of communality); *Technology/Digitalization/Automatization* (development then-now; new technology and new organising); *Organising* (which part of the organisation; meetings; relations to other teams); *The Boss at work* (the role of managers; information; leadership); *You at work* (your role; your responsibility; your contribution; expectations; rights; relations between boss and co-workers); and *The future in 5-10 years* (what will it look like?; how do you get there?). All respondents were informed and approved consent before the interviews. As this was a non-interventional study, no ethics approval was needed according to Swedish regulation.

The first approach towards the material involved individually reading the interview transcripts by the three authors, focusing on the multitude of linguistic clusters, tropes or figures of speech (Wetherell & Potter, 1988), that were negotiated within the interview material (Hallin et al., 2022). In this first round of analysis, the use of a discourse of promoting equality in the Industry 4.0 workplace in the empirical material became apparent. This discourse was in no way unexpected, as increasing equality is a frequently mentioned topic in Swedish Steel industry official documents and webpages (see for instance Jernkontoret, 2022).

In a second step the authors jointly read and reread the interview transcripts searching for first (enacting identities and relationships), second (responding or rejecting positioning) and third order (arguments referring to other conversations) positioning made in relation to the role of blue-collar workers. These three levels of positioning often occur in parallel in the same conversation (van Langenhoven & Harré, 1999). All coding was done manually. After discussing and comparing our separate readings, we extracted quotes into a shared excel document, trying to be as inclusive as possible, to get an overview of the (extensive) empirical

material. This overview reflected arguments supporting the discursive construction of the blue-collar worker as *concept* (Phillips & Hardy, 1997); what the blue-collar was, is and might become in Industry 4.0.

In a third step we went back from the extracted quotes of interest to the full interview transcripts to understand the respondent´s workplace role and the previous conversation between the respondent and the interviewer, paying particular attention to tensions and contradictions through the empirical material (Burr, 2003). The construction of the discourse of equality grew detailed and nuanced through inclusion of extracts regarding co-workers as interchangeable (and thus required to be equal) in everyday work and the construction of equality between different professions (such as between blue and white-collar workers).

To explore the discursive constructions taking place in the interviews further, in a fourth step we actively searched for examples of constructions of workers as not suitable. In this way we were able to explore the question of the blue-collar worker as *object* (Parker, 2015)*;* who the blue-collar worker is, and who (s)he is not.

In the *Findings* section below, extracts from the interview transcripts have been carefully selected to reflect the original transcripts, including the tensions and variations within the empirical material. As all interviews were conducted in Swedish, translation into English is a challenge when aiming to be true to both exact wording and cultural meaning (Berger & Luckmann, 1966). The delicate matter of multilingual research is highlighted by Steyaert and Janssens (2013, p. 132) who, in response to "the unreflected and unreflexive use of English as the language of publication", urge scholars to take seriously the visualization of multilingual research in translated publications. Furthermore, Temple (2008) summarizes that "narrative identities are formed using languages, so it matters which languages are used, in what contexts and for what purposes" (p 362). Thus, we humbly conclude that even though we took great care in translating the empirical material, we acknowledge that the exact details of Swedish melody and pronunciation are lost. The quotes presented in the *Findings* section are, nonetheless, carefully selected to display as much as possible of the material, including the tensions and variations within it. Quotations have been carefully translated from Swedish by the authors and thereafter proofread by a native English-speaking translator.

Findings

In this section the construction of the blue-collar worker in Industry 4.0 explores the discursive production of *concept* (Phillips & Hardy, 1997): what the blue-collar worker is and might become, and *object* (Parker, 2015): who the blue-collar worker is, and who (s)he is not.

What the blue-collar worker is – and might become – in Industry 4.0

In the empirical material, the blue-collar worker is simultaneously positioned as deskilled and standardized, but also as highly skilled and equal to the white-collar worker.

Positioning the deskilled, and standardized worker

Several accounts were found in the material where the importance of the blue-collar workers having streamlined skills was put forward. For example, Oscar, a 59 year-old HR-director, described the blue-collar worker of the future in the following way:

> *You need another breadth in competence, so someone who has little to do can go in and do other things. The planning and these flows and to really be able to hit the optimal staffing at each specific moment, that is hard. But I think that is a success factor that you need to get to. I think you don´t have any alternative really.*

Here, the blue-collar worker in the digitalized industry is constructed as they need to be equally skilled as his/her peers and able to replace other workers, being able to adapt to each other. Even as this points to broader competence requirements, former requirements of craftsmanship and specialized skills are no longer sought for among workers. Likewise, Robert, a 53-year-old operator at a robotised unit said: "Well, you need the ability to work in a team, because we are dependent on each other. Especially now when there are so few of us." This constructs dependence as essential for building social equality within the team.

Freddy, a 26-year-old operator described a "good operator" as someone "eager to learn". He continued: "The old way was more of craftmanship. The new way [...] is more like the same [way to work] for everyone". In this quote, learning to become a "good" operator is constructed as working in the same manner as everyone else. Another example of this is found in an interview with Allan, a 50-years-old operator at a robotized unit:

> *Interviewer: What do you think are the benefits of this [digitalization](...)?*
>
> *Allan: Well, it's easier to teach people to do the same. Because I mean before we did more by hand and it was more individual how you approached work. Now you see that there is something wrong in this row, I have to do this to make it right.*
>
> *Interviewer: And that is good because?*
> *Allan: It´s easier to learn. It's more like: 'this is right, this is wrong'.*

deskilled blue-collar workers as mutually equal in the sense that they are interchangeable with a presumed equal level of skills.

Positioning the blue-collar workers as highly skilled and equal to white-collar workers

We were told that due to increased digitalisation, the difference between blue-collar workers (with bodies that endure dangerous and dirty work) and white-collar workers (behind screens in clean, safe work environments), would be disappearing. This was addressed by the 59-year old HR-director Oscar (who earlier on in the interview pointed to blue-collar workers of the future as interchangeable). Preceding the quote below, Oscar described the balancing act of the company's generous salaries in parallel with cost savings during hard economic times. Replying to this, the interviewer posed a question related to information obtained in an earlier interview that the company today only employed about 20% of the number of employees as in the 20th century. Oscar's first response was to position himself as new at the plant, and hence not as personally to blame for the decreased number of operators. Thereafter, he initiated a shift in the conversation, away from the topic of the numbers of employees, to the company culture, which he depicted as displaying eroding differences between white and blue-collar workers:

> *The line between what a white-collar worker is and what a blue-collar worker is has been blurred. […] We used to say that a blue-collar worker was someone that worked with his hands, at least 50% of the time, while a white-collar worker sat in front of a screen and typed, but [addressing the researcher] you've seen this when you've walked around, there are very few people that work with their hands now.*

This extract displays a managerial response to the apparently provocative conversation related to the threat towards blue-collar workers manual labour when robotizing industry. In his response, Oscar positions blue-collar workers and white-collar workers using the discourse of enhancing equality to describe the relationship between different professions in an organisational hierarchy that is presumed to soon be part of the past. In this quote, the transition towards Industry 4.0 is thus constructed as holding a promise of the traditional separation between employees based on types of labour disappearing.

In line with Oscar's construction of the organisationally equal worker, Jonas, a 32-year-old operator, responded to the question of his expectations on blue-collar work in the coming ten years, saying: "my boss had talked to someone that said that it [blue-collar work] could be more like the work of engineers". Likewise, Ralf, a 42-year-old technology coordinator described the blue-collar worker in the digitalized plant as in need of "more analytical and engineering knowledge". Gert, a 54-year-old operator described how a good operator must "be independent and you need to know math (…) you need to be able to read between the lines (…) able to collaborate with management (…) [and] have well-developed social skills".

These are examples of how operators produce the concept of the blue-collar worker in Industry 4.0 as socially and intellectually highly skilled in a work role characterized by equality between blue-collar workers and white-collar workers (such as engineers and management).

Who the blue-collar worker is – and who is *not* a blue-collar worker – in Industry 4.0

In the empirical material, the *object* (Parker, 2015) i.e. constructions of who counts as a blue-collar worker – and who (he) is not – is analyzed to explore the discursive negotiations of boundaries for being an equal blue-collar worker in Industry 4.0. These boundaries are in the empirical material drawn in relation to older workers, immigrant workers, mentally challenged workers, and temporary workers.

Exclusion of the deviant worker

Using the two constructions of the de-skilled and the highly skilled blue-collar worker, one of the interviewers proposed these as a matter of either-or, when talking to Jenny, a 40-year-old HR-business partner at a robotized plant:

> *Interviewer: If you look at blue-collar workers, you are interchangeable because you no longer need the craftsman's skills. So, what is the difference between the really, really skilled and competent operator [...] and the one that is deskilled and interchangeable?*
>
> *Jenny: I would say that it's of course about competence, but it´s about your personal ability as well; the ability to structure, ability to communicate, ability to engage with others [...] so it's really all about your personality [...][The company] has changed so much over the past years that I have been here. [...] We used to have some people we called '1%-people'. [...] They emptied waste baskets and stuff. There is no place for them here anymore.*

First, in this response, the responsibility for being included as object in relation to the concept of blue-collar worker was constructed as depending on "your personality"; the ability to be positioned as a blue-collar worker depended on how the worker displayed and acted his/her social skills. Second, the skilled mind was constructed as a barrier to be included as a blue collar worker in Industry 4.0; to the extent that those without the required level of mental ability were constructed as un-abled in the workforce of equal (ly deskilled/skilled) workers.

Another example related to ableism was 60-year-old operator and local union representative Keith who said: "Today the teams have harsher requirements for who gets employed. So, they can be mean to each other too, some have less ability and others more. That makes you mean to each other." Here, the responsibility for equality in the collective of blue-collar workers was not placed on management, but on the blue-collar worker "team", and bullying of those with "'less ability" was constructed as a normalised consequence in every-day work.

The two quotes above are examples of how the responsibility of being standardized *and* highly skilled was discursively placed on the individual, as well as on the collective of blue-collar workers, not on management or on technological or societal change.

A second boundary was related to ageism, where a generational divide was constructed in the interviews in relation to the (un)able worker. For instance, Curt, a 50 year-old technology coordinator said: "It´s frightening, this shift in generations. We have a fairly high number of middle-aged workers here, and those that have worked here the longest, they weren't on the train from the beginning [...] they can´t get a grip". The inability of older workers was even constructed as a cause of illness and social exclusion, as operator Keith explained: "The older ones, those that can´t keep up. [...] They sort of become rehab cases. What are they to do? [...The older workers] can work in a spare room, become an oddjobber, but we don't have many of them at all." This was an example of how old workers were positioned as both nonskilled *and* non-standardized, to the extent of affecting their personal health, becoming "rehab cases".

A third boundary was constructed through accounts of racism. For instance, Flavio, an operator with a non-Swedish background, described an incident where he became engaged in a fistfight with another operator due to insults based on his ethnic background. In Flavio's account this incident was overlooked by management as "normal" and part of the "industry culture" today, positioning himself as deviant towards the organsational norm. Other employees described how the rise of the (far) right-wing political party known as the Swedish National Democrats (SND) had contributed to xenophobia among colleagues. For instance, union leader Keith explained a current conflict: when the union tried to employ immigrant workers, SND members opposed and left the union. Keith decaled that this was weakening the collective power of blue-collar workers and left his hands tied, as the conflict around immigrant workers had become a source of tension in the workplace.

A fourth boundary, related to the tension described above, was related to temporary workers. These workers were described with derogatory words like "just temps". 38-year-old operator Manuel, who today works at a robotized unit described his own skills development in relation to temporary workers:

> *There are other machines that are more manual, but I only stayed there two years, because no one wanted to run those machines. Only temps ended up there. Because you must develop yourself, it's a step forward to run the more advanced machines with robots and programming.*

This account separates the "us" and "you" in "no one", from "they" in "the temps". Manuel is aligning his self-positioning with the highly skilled and equal worker in relation to white-collar workers (engineers and programmers), while positioning temporary workers as deskilled and stuck at manual machines. On the contrary, 56-year-old operator and local union representative Lennart said "It's really important that they [the temps] don´t learn everything,

because then they will be really hard to get rid of, I dare say. They might learn two or three job tasks, but not, like, ten." Here, temporary workers were constructed as needed to stay non-standardized and non-interchangeable (non-equal) through not learning several tasks, thus positioning the temporary worker as deviant from both the position of the skilled and equal worker, and likewise from the deskilled and standardised worker.

The constructions of "un-abling" through ableism, ageism, racism, and forms of employment would overlap between themselves in the interview material. One such example was made by the operator and union representative Lennart who later in the interview continued:

> *Lennart: They [the immigrants] are among the temporary employees. Not because [the company] are searching for them, that's the way it is.*
>
> *Interviewer: They [the temp agencies] engage them?*
> *Lennart: Yes, for equality, or diversity. So that way we get it for free.*

The presence of the immigrant blue-collar worker was here directly related to equality, but as seen in previous quotes simultaneously positioning immigrants, as temporary workers, as unable and deviant in relation to both the skilled and equal to white-collar workers, and the deskilled and standardized workers.

Consequences for inclusion among blue-collar workers in Industry 4.0

The analysis of the extensive empirical material displays how the repertoires mobilized of seems to promote equality while actually reinforcing tensions between social groups at the workplace. As the findings indicate, the blue-collar worker is positioned as *performing equal* (low skilled, interchangeable) *tasks;* as *equal to other professions* (white collar; engineers and managerial positions); and as being *equally young, socially skilled and native language speaking*. However, this use of discourse displays a dilemmatic discursive construction that appears to be non-excluding, while, in fact, having contradictory consequences (Dobusch, 2021; Nkomo, 2013). In fact, the discourse of equality is constructed based on abilities and experiences that are only shared by a fragment of this collective; the young, well-versed, socially skilled, and fast learners, who have permanent contracts.

Even though older, immigrant, and socially, analytically, linguistically less skilled, or temporary, workers are present as humans in the industrial plant during the transition towards Industry 4.0, they fail to be defined within the subject positioning of the blue-collar worker as object in this context. This finding not only highlights the embedded conflicts in the social shifts that come with the transformation towards Industry 4.0 (see Abrahamsson & Johansson, 2021); it also showcases how the use of discourse is important, as mistreatment of subordinate groups tends to become muted in organisational narratives (Meares et al., 2004). Only by

exploring the fluctuating and relational aspects of the deviant-from-the norm workers we are able to discuss and act on unintended social exclusion (Dobusch, 2021, p. 380).

The official claims of Industry 4.0 points to a shortage of skills in Swedish industry and argues for skills validation for immigrants as well as continuing education for older workers (Ministry of Enterprise and Innovation, 2016). This could potentially provide underrepresented groups, as well as older blue-collar workers, the possibility to enter and remain employed. However, previous research on Swedish workplaces displays structural mistreatment of immigrants (Rosander & Blomberg, 2022). As seen in the analysis, the discursive negotiations of the concept and object of the blue-collar worker correspond to socially prevailing discriminating mechanisms of, for instance, ageism, racism, and ableism on an ideational level of societal norms. It could even be argued that the exclusion of immigrants (of whom there was a large-scale influx during the 21st century) in the transition towards Industry 4.0 reproduces the extreme right-wing political messages that are progressing in Sweden, as in many European countries, in the 21st century.

The analysis displays that the individual's personality is constructed as crucial in fitting with the concept of the Industry 4.0 blue-collar worker. This corresponds to previous studies in other digitalized work settings where the individual's personality (her way of being, feeling and thus behaving) becomes discursively constructed as a prerequisite for being an appropriate worker in digitalized workplaces (Lindell et al., 2022). Brynjolfsson and McAfee (2014) described the link between digital technology and social polarization as a matter of the individual's own responsibility for (and possible neglect of) her employability. Therefore, adopting an active position for the blue-collar worker is only conditionally possible when he/she as an individual accepts and adapts to the discursive constructions of subject positioning used to explain the role of humans in industrial change. By adopting the discourse of equality, individuals become positioned as morally responsible for their own competence development and inclusion in the collective of equals, but morally non-responsible for the social exclusion that inevitably seems to be the consequence. As stated by Phillips and Hardy (1997, p. 166): 'Discourses do not reveal some hidden, pre-constituted reality, but rather provide concepts, objects and subject positions that actors use to fashion a social world'. This study confirms such an observation, nuancing the deskilling and upskilling and polarization of skills debates (Blauner, 1964; Braverman, 1974; Budhwar et al., 2022; Haakestad & Friberg, 2020; Martinaitis et al., 2021), and previous claims of preferred skills for employability in Industry 4.0 (Jaiswal et al., 2022; Schwab & Zahidi, 2020). The study highlights that if only a few blue-collar jobs are left as Industry 4.0 progresses, the criteria for being positioned as a blue-collar worker is discursively narrowed down to only fit those that have the right attitude, experience, background, and mind that match this development.

Practical implications

The existence of inequalities is often silenced in relation to technological development (Spencer, 2017), which might make processes of exclusion difficult to detect and track by managers and HR-professionals in practice. The discourse analysis approach adopted here allows us to make visible how inequalities between groups persist and evolve, despite eager attempts among managers and HR-professionals to follow the 'inclusion turn' (Adamson et al., 2021) in developing industry. Even though the exclusion of, for instance, immigrant workers is known both in practice and in previous research (Baxter & Wallace, 2009; Rosander & Blomberg, 2022), this article points to the need to take the discourse of equality, and the exclusion that seems to evolve in the transition not only towards Industry 4.0, but towards Industry 5.0, seriously, also by HR-professionals and managers in order for a more heterogenous *and* equal workplace, where unknown skills are taken advantage of, to emerge. In the emergence of Industry 5.0 human-centric, up- and re-skilling among workers is denoted as important for a resilient European industry (European Commission, 2023).

Theoretical implications

Theoretically, this article provides an explanation to the delicate relationship between construction of concept (Phillips & Hard, 1997) and object (Parker, 2015) into the framework of critical discursive psychology. The originality of our study lies in applying an understanding of the contradictory construction of the blue-collar worker in Industry 4.0 (Herzog et al., 2017; Xu et al., 2018; Autor et al., 2003). Focusing on the discursive constructions of the *concept* of the blue-collar worker (Phillips & Hardy, 1997); i.e. on what the blue-collar *was*, *is* and *might become* in Industry 4.0, and the *object* of the blue-collar worker (Parker, 2015)*;* i.e. *who* the blue-collar worker is, and who (s)he is not. This detailed investigation of language use add to the insights of how technological change not only alters power relations (Ibrahim, 2012), but serves to reproduce, and recast, existing social structures (Schou & Hjelholt, 2019). The focus on discursive positioning makes it possible to explore the dynamic aspects of how employees, managers and HR use discourses when describing their work, allowing for close investigations of negotiations of societal and organisational change (Whittle et al., 2008). The empirical material in this study is neither merely reproducing managerial discourse, nor is it merely reactive or resistant to technological change. Instead, it displays discursive negotiations in relation to the societal and technological change that is taking place (Golden & Geisler, 2007; Whittle et al., 2008).

Limitations and future directions

The limitations of our study point to the need for further studies. Demands of continuous learning may increase due to ongoing changes (Jaiswal et al., 2022). The discursive construction taking place implies a resolution of the traditionally strong blue-collar worker collective; when everyone is equal, as borders are floating and disappearing, a collective is no longer possible, or even needed. As individualization is taking place, and as the individual

worker's personality and employability is placed at the center of the blue-collar worker concept. This development is likely to enhance the vulnerability of the worker. Future studies on the development of Industry 4.0 should be added to previous research on the use of discourses among unions and policy makers, to explore the consequences of individualization as the power of the union collective might dissolve in the wake of Industry 4.0.

Conclusion

Critical thinkers of digitalisation claim that digital development is a driving agent of economic and social inequalities in society (eg Peters, 2013). As the need for steel industry workers is declining in contemporary industry, discourses of equality might be used to explain and legitimize industrial transformation under the notion that the roboticized industry is safer, cleaner and in many ways better for human bodies and further require a more skilled individual. Digital and technological development is *perceived* as inevitable and therefore without political intentions. Therefore, adopting an active position for the blue-collar worker is only conditionally possible when he/she as an individual accepts and adapts to industrial change. As an individual he/she needs to develop and keep up with the speed of digital development, conditioned to the right criterions of inclusion. By adopting the linguistic constructions explored in this study, individuals become positioned as morally responsible for their own competence development and inclusion, but morally unresponsible for the social exclusion that inevitably seems to be a consequence of the construction of digitalization. Thus, the article adds to the insights of the symbiotic relationship between technological change and discourses as well as to how technological change serves to reproduce existing social structures (Schou & Hjelholt, 2019) in Industry 4.0.

The theoretical framework used in this article points to the capability of humans to exercise choice in language use (Wetherell, 1988) as a way to master ongoing social changes. Even if dominant, repetitive use of discourse is powerful, since it sets the horizon for what can be said and which positions can be constructed in a certain setting, repeated resistance holds the power to modify and change social consequences (Wetherell & Potter, 1993). This article thus points to the need for managers, labour unions, and policymakers, to take seriously the construction of inclusion and exclusion expressed in this study; the homogenization that is taking place in the Industry 4.0 workforce deserves further attention. Through this conclusion, this study contributes to understandings of changes of employees´ working conditions, which puts "research and innovation at the service of the transition to a sustainable, human-centric and resilient European industry" for the advancement of a truly human-centric Industry 5.0 (European Commission, 2023).

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1 Data is available upon reasonable request from the authors.