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ARTICLE

'My whole body is at work': the silence of gendered body techniques in cork industry in an era of automation

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ABSTRACT

Discourses about technological transformation tend to focus on technology, as if its introduction was neutral regarding local variabilities, and the men and women that make it effective. This paper focuses on the technical act. The body is where the technical acts are inscribed and it is through the body that they are exteriorised. The purpose of this paper is to analyse the operative modes associated with the technical acts, from a gender perspective, in the context of the technological transformation in cork industry. The analysis of the work activity performed by men (punching operators) and women (choosers) was supported by observations, collective interviews, and group sessions to validate the results. The findings show male- and female-specific body techniques; how the efficacy of the technical acts contributes to the debate about the limits of technology; and how body techniques and effects on health tend to remain in silence due to automation.

Practitioner summary: The reconfiguration of the human-machine relationships hardly leaves room for the analysis of how the body techniques evolve. This paper shows how the efficacy of men and women body techniques contributes to the debate about the limits of technology, even if these uses of one's body entail health costs.

Abbreviations: Ch: chooser; PO: punching operator; TCA: trichloroanisole

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Automation; gender; technical act; body; occupational risks

1. Introduction

1.1. Automation, gender, and body techniques

Technological transformation is at the top of the public agenda about the future of work and employment (COE 2017; Eurofound 2018; Goos et al. 2019). The goal for an increase in the production capacity and, sometimes, the promise of a contribution for health and wellbeing at work (Nazareno and Schiff 2021), by the announced decrease in repetitive tasks, are recurring arguments sustaining this debate.

Under the scope of new human-machine relationships triggered by automation, little do we know about (i) the emerging occupational risks associated with work evolutions (Badri, Boudreau-Trudel, and Souissi 2018; Bobillier Chaumon 2021; EU-OSHA 2018; Leso, Fontana, and Iavicoli 2018), (ii) the new uses of oneself developed by workers (Poizat 2015; Rot and Vatin 2018), and (iii) their differentiated impacts on men and women's health (Eurofound 2020; EU-OSHA 2014).

These issues are never gender-neutral (Caroly, Bohórquez, and Fortune 2020; Casse and De Troyer 2020; Howcroft and Rubery 2019; Piasna and Drahokoupil 2017). Knowing that 'women are not like other men' (Lacomblez, Ollagnier, and Teiger 2016, p.1, free translation), the gender dimension assumes the status of an analysis category with a high heuristic potential (Cunha, Nogueira, and Lacomblez 2014; Messing, Lefrançois, and Saint-Charles 2019), considering the different uses of the body in the construction of technical acts.

This is a critical moment to explore the relations between body techniques and gender. Over the last decade, both pace and scope of automation have increased in a wide spectrum of activity sectors and tasks, supported by a discourse that stands for another conception of work - a work that is more about machine supervision and less about direct intervention upon raw materials (Rot and Vatin 2018); and a work of less body involvement, as if 'zones of bodily indifference' (Morgan,

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.

Brandth, and Kvande 2005) were emerging through new 'disembodiment' injunctions.

At the same time, this automation wave advocates technological changes and their consequences are universal, hence diminishing the importance of a gender approach. This is an opportunity, therefore, to understand the impacts of automation on work activities performed by women and men, taking into account the unique contexts where they occur and how differentiated the work experiences become.

Though automation is frequently looked at as an alternative to the tasks' repetitiveness, it is how much we do not know about the situation's variability and the workers' compromises to manage it - which encompasses gestures, postures, utilisation schemes, 'know-how of caution' (Cru and Dejours 1983), regulation strategies -, that misleads us to believe that there are more situations susceptible to automation than what is indeed achievable (Poizat 2015; Pfeiffer 2016). Overlooking local conditions under which work activity is developed leads, as Ouellet and Vézina (2008) remind us, 'to the belief that a repetitive task can be learned quickly and that all it takes is to observe other workers in order to be able to do the work' (p. 25). The work activity analysis, focusing on the technical act, however, reveals other reality.

Considering the scientific tradition of work psychology and activity ergonomics, the interest for operative modes associated with the technical act makes it possible to reveal how body techniques develop and transform, and how the gender dimension is part of that evolution (Lacomblez, Ollagnier, and Teiger 2016). In this perspective, an approach to the technique is not solely machine-related, but refers to 'effective traditional acts', recovering Mauss's (1979) formulation. According to Mauss (1935, 2009), the technique is an action which 'has to be effective and traditional. There is no technique and no transmission in the absence of tradition' (Mauss 2009, p. 82). The technique, thus, refers to know-how, developed on-the-job, often involving body transformations (Séris 1994). Mauss's (1935) reference to 'body techniques' denotes the body does not remain indifferent to the techniques that are developed. In this vein, it is necessary to understand the ways in which men and women know how to use their bodies, and what is the place reserved for the body in each technique (Séris 1994).

The technical act is an embodied competency; is the synthesis of the use of the body, artefacts and situational conditions, involving factors that constraint as much as those that promote their permanent readjustment and evolution. Hence, the technical act is 'equipped' (Sigaut 1999), it does not result from an 'appropriation' per se of a shared tradition. Quite the opposite, it requests the omnipresence and the use of a 'body-self', according to the specificities of each situation (Schwartz 2000). It is indeed a specific engagement of the body, in performing the technical act, in which converge the biological, sensorial, psychic, cultural and historical dimensions. The 'body-self' is, then, the deciding entity of the technical act, between what is conscious and what is embodied, and encompassing values that inscribe hierarchised ways of acting in our body (Schwartz 2011, 2021; Séris 1994).

Taking the body techniques at work into consideration also implies an understanding of the transformations they induce (Pillon 2014), both from the activity viewpoint (e.g. competencies, acquired perceptive capabilities, and the recognition by the workers' group), as well as from the 'body marks' viewpoint. Body marks can result from work effects on health, but there are also other marks, more or less discreet compared to the aforementioned ones, bearing in mind what Pillon (2014) states: 'in its permanent relation with instruments, materials, machines, it [the body] saves an unmistakable trait' (p. 167, free translation). On the whole, the body is always formed, but also deformed, by technique.

1.2. Objectives

The purpose of this paper is to analyse the operative modes associated with the technical acts and their evolution, from a gender perspective (Laberge et al. 2020), in the context of technological transformation in cork industry (Cunha, Silva, and Macedo 2021). This analysis also seeks to address how the technical acts raise the debate about technological change options in small-sized companies from a cork industrial district.

2. Materials and methods

2.1. Framework

Cork sector is the only one where Portugal is a world leader, in terms of production and transformation as well as exports (APCOR 2021). Notwithstanding, a look that intersects, simultaneously, a macro and a micro level of analysis sheds light on other singularities of this sector beyond the economic dimension. A few examples thereto are (i) its 'territorial agglomeration' in Northern Portugal (County of Santa Maria da Feira), recognised as an 'industrial district' (Branco and Parejo 2011); (ii) the predominance of micro-companies manufacturing cork stoppers, and whose activity is to

Table 1. Companies' characterisation.

	Company 1[a]	Company 2[a]
Year of foundation	1979	2012
Number of workers	40	12
Work schedule	Three fixed shifts, from Monday to Friday: morning shift (8 am–5 pm); afternoon shift (4 pm−12 am); and night shift (12 am−8 am)[b]	8 am–5 pm
Stages in the production of cork stoppers	Rectification; **Selection** (or 'Choosing'); Washing and surface treatments; Printing; Gluing; Extrusion; Final inspection and expedition	Trimming; Cutting; **Punching**; Rectification; **Selection** (or 'Choosing'); Washing and surface treatments; Printing; Gluing; Expedition

[a]The production sections under analysis in each company are identified in bold.
[b]The schedule applies to all sections, except for choosing, that has only a morning shift.

Table 2. Characterisation of participant workers.

Code	Activity	Company	Gender	Age[a]	Seniority in the company[a]	Seniority in the cork sector[a]
Ch1	Chooser (Ch)	1	Female	52	10 years	18 years
Ch2		1	Female	58	37 years	43 years
Ch3		1	Female	55	30 years	41 years
Ch4		1	Female	51	4 years	30 years
Ch5		2	Female	58	12 years	45 years
Ch6		2	Female	55	2 months	34 years
Ch7		2	Female	54	2 months	37 years
Ch8		2	Female	27	6 years	7 years
PO1	Punching operator (PO)	2	Male	47	11 years	34 years
PO2		2	Male	67	2 months	53 years
PO3		2	Male	59	1 month	26 years
PO4		2	Male	45	4 years	31 years

[a]Data collected when the field research began (October 2019, for company 1; February 2020, for company 2).

some extent regulated by a large company; and (iii) a strong gendered segmentation of the work activities (Mendes 2002).

In this paper, we present the activity analysis carried out in two companies from this 'cork district', both part of the 'CORK-In research project' consortium (Cunha, Silva, and Lacomblez 2021; Cunha, Silva, and Macedo 2021). Table 1 shows a brief characterisation of these companies and their production processes.

Both companies show similarities regarding the organisation of the production process. While company 2 encompasses all the stages in cork stoppers manufacture, in company 1 the sections of Trimming, Cutting, and Punching are absent.

The work situations under analysis were the punching operators, who punch the cork stripes with a drill to produce cork stoppers (in company 2), and the choosers, who select the cork stoppers according to different criteria (in both companies). These two work activities are gender-segmented: punching operators are male and choosers are female (Cunha, Silva, and Macedo 2021). A detailed description of these activities is presented in section 3.1.

2.2. Participants

Twelve workers participated in the study: all choosers from both companies, and all punching operators from company 2. This sample included eight women and four men, constituting two sub-samples: the choosers (n = 8), aged 51 years old on average, and 31 years of seniority in the cork sector; and the punching operators (n = 4), aged 54 years old on average, and 36 years of seniority in the cork sector.

Choosers and punching operators' informed consent was asked in person. All workers accepted to participate in the study, whose characterisation is presented in Table 2.

Despite the differences from a seniority point of view (in the company and in the cork sector), as far as age is concerned there was a younger female worker (Ch8), who was also the only worker who had never performed the activity when it was strictly manual. In this case, her learning process has been mostly done in the relationship with her automated selecting machines.

2.3. Procedure

For the analysis of how the body techniques evolved in both work situations, the methodology was drawn on a qualitative approach to the analysis of work activity (Lacomblez et al. 2007; Messing, Lefrançois, and Saint-Charles 2021; St-Vincent et al. 2014). This 'activity approach' seeks to situate the actions of workers in relation to their context/situation, in order to

Table 3. Design of the study implemented in the cork companies.

Methods	Company 1	Company 2
Exploratory interviews	Two interviews with managerial staff and two additional meetings with the foreman and the quality manager were held (in a total of 5h)	Two interviews with managerial staff and an additional meeting with the foreman were held (in a total of 4h)
Observations *in situ*	The choosing activity was observed for a total of 14 hours (in the morning shift)	The two work activities under analysis were observed for a total of 30 hours
Collective interviews	Two interviews (2 choosers per interview), which lasted, on average, 1 hour	Four interviews (2 workers per interview), lasted each one, on average, 1 hour and 20 min
Group sessions	One final group session to return and validate results (1 hour)	One group session[a] to return and validate results of the observations was held (1 hour)
Interview with the union	One semi-structured interview with the president of the union for the cork sector (which lasted about 2 hours)	

[a]Two group sessions were scheduled. The first meeting was held in 2020 before the COVID-19 pandemic. Due to the public health crisis, the second meeting was postponed and will take place in the second half of 2021.

understand the determinants of the work activity, work regulation strategies, and impacts on health. Table 3 presents a systematisation of the analysis methods used in each company.

In both activities, observations encompassed all visible actions and verbalizations of workers, even though the researchers cannot initially link them to task requirements (Laperrière, Messing, and Bourbonnais 2017). The observations were carried out by three researchers. Notes were registered and organised in 'shift logs' - as a '*chronique de quart*' (Calvet et al. 2012) - including time; places; tasks; interactions with colleagues or foremen; and temporal and organisational constraints.

In both companies, an initial stage of open observations took place, considering what the workers pointed out as 'reference situations' in their activity (e.g. machine tuning; anticipation of stops/jams). Mastering these reference situations is what makes them recognised as skilled workers. Then, systematic observations were concentrated on the following categories of observables: activity places, machine interactions, and body usages (e.g. gestures, postures or movements the workers considered critical elements of their expertise). To support these observations and their qualitative analysis, the research team recorded (audio and video) and photographed some of these activity sequences. Video recordings and the use of photographs enabled, on the one hand, a detailed description of certain activity traces (e.g. use of photographs to describe visual and tactile reference points that choosers and punching operators use to manage the cork stoppers' defects) and, on the other hand, served as mediators to explicit the 'anchor moments' of the technical acts (Vermersch 1989). An in-depth analysis was thus supported by these recordings (e.g. clarification of body position when placing the stripes in the drill while making pressure, in the case of the punching operators).

Fieldwork observations were then complemented with collective interviews, inasmuch as the use of the body at work cannot, on the one hand, be understood merely from *in situ* observation (Petit, Chassaing, and Daniellou 2009) and, on the other hand, should not be disconnected from the intrinsic debates about the 'uses of oneself in activity' (Schwartz and Durrive 2003). The collective interviews were conducted with the pairs of choosers and punching operators (see Table 3). To begin with, the workers' professional path was explored and, in a second moment, the conditions for the development of body techniques at work were addressed as well as the reasoning behind them, trying to confer visibility to the expression of the use of the body in words. Data analysis followed an inductive approach, revealing categories from the workers' discourse related to the description of the technical acts, their evolution, and their perceived impacts on health. Some verbatim extracts are provided in the results section to illustrate this analysis.

2.4. Validation

Group sessions were held with the workers to guarantee results validation. According to Messing, Lefrançois, and Saint-Charles (2021), these validation sessions enrich an understanding of how complex workers' strategies are and how they involve work techniques that are specific to women (the choosers) and men (the punching operators).

In company 1, in addition to the group session with the workers, the results were also presented to company key actors (head of the company; quality manager) in a separated meeting, so as to validate the results. In company 2, two results validation sessions were arranged: one session was held with the workers; and another session was scheduled with the company's decision-makers (as alluded to in Table 3, this

second meeting has been postponed due to the pandemic crisis).

3. Results

3.1. The choosing and punching activities and their impact on the operators' health

Regarding the punching activity, performed exclusively by men, the activity is defined by handling a drill to manufacture the stoppers by a foot pedal. It is an activity that requires the repetition of the foot movement to operate the drill and the arms to slide the strips synchronised with the rhythm of the foot and the movement of the drills. In company 2, each punching operator produces around 18 thousand cork stoppers/day, depending on the quality of the cork strips (e.g. type and number of defects). The punching operators always stand and the movement of the manual drill requires movement from the entire body (see Figure 1).

This use of the body entails costs for the punching operators' health, particularly in the area of the cervical spine:

> *'The spine (…). We over there [in the drilling section] are always punching, at that rhythm … By the end of the day, the legs, the muscles, here this part of the muscles [the punching operator shows his arms]. It's because we are holding the strips, it does not seem like it, but we use our strength in all this area [from the shoulder to the wrist]'* (PO1).

As far as the choosers are concerned, in both companies, they work in pairs at the manual choosing conveyor belts (four choosers; two manual choosing conveyor belts), where they choose the cork stoppers according to the quality classes and based on the existence of defects (see Figure 2). The choosers separate the cork stoppers as they roll on the belt, based on their visual appearance (e.g. level of porosity) and defects (e.g. cracks, little holes caused by insects, or excess of moisture in the stoppers), but also according to each client's quality criteria (Cunha, Silva, and Lacomblez 2021; Silva and Cunha, in press).

At the manual choosing conveyor belts, the operators perform their activity either sitting or standing, demanding the movement of arms and shoulders to select cork stoppers. The main health complaints have to do with pain in the cervical spine, tendonitis in the shoulder area and pain in the wrists:

> *'We try to be in the best way, like this* [the chooser shows the position she uses when in front of the conveyor belt]. *But this…, I usually have bruises here* [she shows the left wrist], *because I am always forcing* [supporting the left wrist on the belt] *to release the spine a little bit'* (Ch8).

The choosers are also in charge of supervising the automated selecting machines. Such machines classify the stoppers according to the look of their surface and separate the defective stoppers. Then, these stoppers are subjected to a manual selection on the conveyor belts.

According to the observations, the automation of the choosing process has not made the manual choosing process disposable. With the automated machines, the choosing process is now faster, as each machine can select and classify between 12 to 14 thousand stoppers per hour. However, these machines cannot identify certain types of defects the stoppers sometimes have, for example, when they read the cork holes caused by insects as natural cork pores, thus failing to reject such stoppers:

> *'There are defects in the stoppers' head that are the same color cork is and the machines cannot detect*

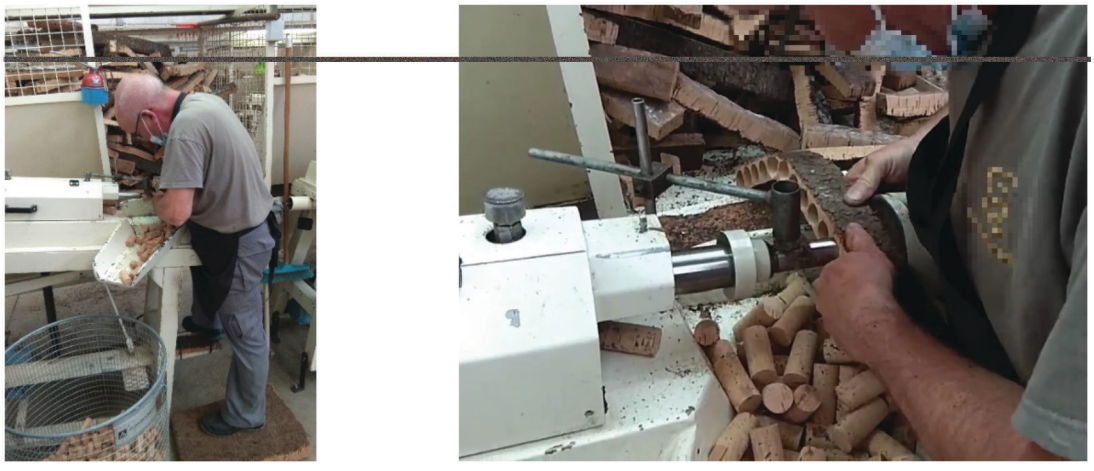

Figure 1. Punching operator (company 2).

Figure 2. Choosing operators in the manual choosing conveyor belts.

those defects. It is like the bug, the machine identifies the bug, it can reject the bug, but then in the following stopper it detects a tiny little hole [cork pores] *and rejects it too*' (Ch8).

In this context, automation in the choosing activity has also imposed new tasks to these workers, related to supply, supervise and clear jams in the machines, as stated by one of the choosers in company 1 during the observations:

'*This automated machine might well be stopped. This machine causes a lot of trouble with smaller caliber stoppers* (…). *We go there and set it free, the machine is restarted, but between one jam and the other we barely have the time to reach the conveyor belt* [the machine is placed right behind the manual conveyor belt]' (Ch2).

In the case of company 2, the most recent technological change with an impact on the work content took place in 2020, with the introduction of the so-called 'sniffing machines'. These machines were introduced with the purpose of assuring the quality of the cork stoppers, given the risk of contamination by a chemical compound (trichloroanisole - TCA), that impregnates them with a mould smell, and that may contaminate the wine. As such, in company 2, the choosers, in addition to the visual selection, carry out the 'sniffing selection', which consists in smelling the cork stoppers after they are previously heated by the 'sniffing machine'.

3.2. Evolution of body techniques

Focusing on the evolution of body techniques, and their learning processes and heritage constitution within each workers' group. Table 4 systematises four examples of technical acts, which the workers identified as conferring them expertise. These technical acts are further explored in the sections bellow.

3.2.1. Between 'getting the haul' and 'read cork with the fingers': the punching operators' activity

'Getting the haul' is one of the body techniques that, in the perspective of the punching operators, takes the longest to be learnt and mastered. These workers highlighted this request for the body to perform the 'haul' decisive to fulfil production demands, but it also reveals the sense of a job well done, as explained by two punching operators during periods of systematic observation:

'*I always manufacture 18 to 19 thousand stoppers per day, it is a very good number, and not many people get it here* (…) [What do you do to reach that number of stoppers per day?] *I get the haul, I take the strip, and as I take it I know exactly where to drill first, I can see where are the defects, bug, woody* (…). *Once the strip is here* [in the drill], *I don't look at the belly* [of the strip] *anymore*' (PO2).

'*Our fingers are sensors. They read the highs* [in the belly of the cork strip], *and we know that we have to remove a "cavaquinho"* [Portuguese word used by the workers to name a little prominence in the cork strip]' (PO1).

To illustrate the operative modes associated with these body techniques and their organisation in time, data collected during the systematic observations were analysed using ActoGraph® (Boccara et al. 2019). Figure 3 presents an excerpt of an activity chronicle with a punching operator.

According to Figure 3, each strip implies a very short work cycle, whose first move is getting the haul. Even during this move, the punching operators 'read' the strip's belly with their fingers, extending this interpretation of the cork until the following move, which is putting the strip on the tab. But the technique continues while they drill the strip (to extract the stoppers), and it only comes to an end when the punching operators separate the edge of the strip (the tip, i.e. when it is no longer possible to extract more

Table 4. Operative modes of technical acts: the punching operators and the choosers.

	Punching operators
Getting the haul	– Technical act that includes a certain body movement and rhythm to get the cork strips. With the right shoulder and arm, the punching operators take the cork strip, placed next to the drill (see Figure 1). In their perspective, this body technique condensates different arbitrations, between quantity and efficacy (make the most out of each strip, to get the higher possible number of stoppers and with the minimum of defects). This body movement also incorporates the decision regarding which strip end will be the chosen to begin the drilling, and which orientation to give the strip according to the existence of visible defects.
Read cork with the fingers	– Body technique when the punching operators feel the cork strip 'belly' with their fingers, identifying the presence of saliences that have to be removed so the cork is uniform. The punching operators do this identification without lifting the strip from the drill and such 'reading' is performed with the left hand fingers (the wrist pressures the strip against the tab, with the fingers 'around' the strip, and the fingers' phalanges feel the surface of the strip's 'belly') (see Figure 1).
	Choosers
Fine-tune the class	– This technique takes place the moment the pair of choosers identifies which stoppers shall go up, or down, the quality class, fine-tuning the selection previously made by the automated selecting machines. The choosers' technical act (one on each side of the conveyor belt, see Figure 2), in the stoppers' identification and separation, condenses sensorial dimensions, but also a shared representation of the work situation within the team of two (e.g. quite often, in silence, the choosers decide on the stoppers' quality, based on shared criteria about what defines each quality class). As such, 'fine-tuning the class' is a technical act that coordinates two bodies; it is a body technique defined by each pair and sustained in the coordination existing between the two choosers.
Use all the senses	– The identification of defects in the stoppers asks for the mobilisation of several senses (touch, sight, hearing, smell and taste). This body technique evolved and was being reinvented based on the evolution in the cork quality (e.g. new cork defects), and on the introduction of automation (e.g. sound discrimination of the automated selecting machines and attempt to discriminate smells that indicate the stopper has, or has not, TCA).

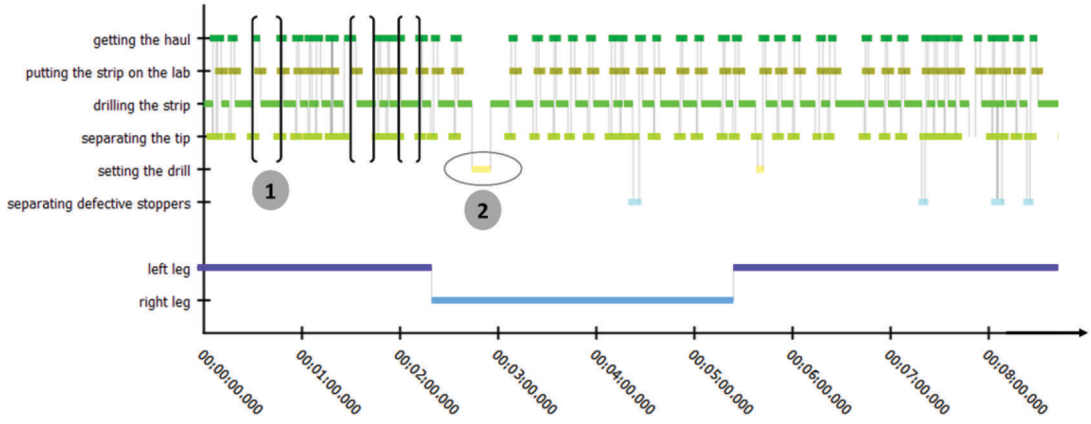

Figure 3. Chronicle of activity with PO3.

stoppers from that strip). It is also possible to observe that this work cycle (1) was repeated for every strip, and it was interrupted only during the moments when the punching operator adjusted the drill (2) because the stoppers got 'stuck' in the drill's cylinder. Lastly, Figure 3 reveals the punching operator changed the leg he used to press the drill's pedal to cope with tiredness.

Technical acts associated with drilling encompass elements of variability and debate among punching operators. In order to avoid defects with the drill, some punching operators use a moving part, referred to as the 'spring tab', which allows the strip to be moved up or down, so they drill the strip at the best possible spot. This is a critical aspect in the activity (to work with a moving or fixed tab):

> *'If the strip has greenness close to the belly, I lower the spring tab and the strip lowers a little. Then the drill will punch closer to the edge, though it cannot catch the edge* [bark layer], *otherwise it gives a defective stopper'* (PO2).

> '[I prefer a fixed tab] *because I am used to working like this, and in the other company this is how I did it. The other punching operators have a moving tab, and the strip goes up so the drill punches closer to the belly's flower.* [How do you do it when the tab is fixed?] *I always drill closer to the belly* [of the strip]' (PO3).

These body techniques from the punching operators enable the drill to 'move away' from the cork defects, hence maximising the strip's consumption. This is a crucial aspect in the decision taken by company 2 not to use automatic drills. Though the

Table 5. Number of years working as a pair.

Company	Pair	Number of years working together
Company 1	Ch1 – Ch2	11 years
	Ch3 – Ch4	4 years
Company 2	Ch5 – Ch8	6 and a half years
	Ch6 – Ch7	2 months (this team of two had already experience of working together in more than one company over their professional paths. Both choosers were hired by the current company considering their experience as a 'pair')

company invested in them, those drills are disconnected. The automatic drills are known among punching workers as a 'blind drill', i.e. it manufactures stoppers in every point of the cork strips, even in the points where the strips show quality flaws. During observations, a worker emphasised this issue, while showing a cork strip and pinpointing where he would manually perforate it:

> *'We have tricks that no automatic drill can master* (…). *Make the most out of the cork, read the defects* [in the strip] *and drill good stoppers. Technology* [from automatic drills] *is only affordable for xxx* [the worker was referring to the largest company in the cork district]*, where if the drill punches everything and makes a lot of waste there is no problem, the cork they ruin serves for other things* [for granular compounds, for instance]. *Not here!*' (PO1).

3.2.2. 'Here I work with the whole body': the choosers' activity

In both companies, the choosers' activity is always performed in pairs. Each pair presents a long experience of working together, as summarised in Table 5.

At the choosing conveyor belts, each pair puts in practice a specific body technique, based on the coordination between the two choosers. This body technique reveals a shared representation regarding the criteria the choosers apply to decide whether a stopper is, or is not, defective, and whether it may go up or down the quality class range (Cunha, Silva, and Lacomblez 2021).

> *'When we have doubts* [whether to reject a stopper, or not], *we think that it is the head* [the top of the stopper] *that matters* [the chooser exemplifies, she grabs a stopper and shows how she handles it with the fingers]' (Ch1).

This is a decision that requires sight, touch (e.g. to identify roughness on the stoppers' surface) and memory (e.g. identification of what a new defect is compared to the defects repertoire they have in mind):

> '(…) *When I learnt, we did not reject the yellow stain* [yellowish coloration]*, because the client didn't consider it a defect. Now, we take it off… And it is actually the defect that contaminates wine the most, even more than greenness* [excess of moist in the stopper]' (Ch6).

Unlike what happened in the punching operators' activity, automation was introduced in the choosers' activity, first with the implementation of automated selecting machines, as mentioned, and, more recently, 'sniffing machines'.

The new ways of work triggered by automation led to a reinvention of body usage at work, calling for all the choosers' sensorial dimensions (see Table 4). The continuous functioning of automated selecting machines is ensured thanks to the choosers' capacity to anticipate and recover from incidents (e.g. stoppers stuck in the machine reading camera), based on the interpretation of the sounds the machine does, as explained during a systematic observation:

> *'We listen closely to the machines…, I know when it is working in vain, for example* [when a stopper is stuck in the machine pocket]. *Look, the knocking sound is different, it is dry. A stopper must have been stuck in the machine pocket'* (Ch8).

The capacity to compensate the limits of automated machines is also noticeable when the choosers identify there are 'deviations', or 'errors', in the selection the machines are doing (e.g. when stoppers from a lower class are being classified as belonging to an upper class in terms of quality). In these situations, the pair of choosers identifies the 'deviation' and reprograms the machines according to the criteria (they both agree upon) about what defines a stopper from each quality class.

But this reinvention of the body technique due to automation is not free of new health costs, as the choosers from company 1 explained when asked about the introduction, in 2012, of an automated selecting machine for champaign stoppers:

> *'The machine is new, it is hardly problematic, all we have to do is fill with champaign stoppers and pay attention when the baskets are full* [with stoppers already selected by the machine] (…). *It works with champaign stoppers, the most common are 47x29mm*

[the chooser refers to the stoppers caliber], *they are very heavy. By the end of the day all the choosers complain about back pains'* (Ch3).

As far as company 2 is concerned, the choosers started to select the stoppers based on smell as well. The development of the body techniques in this operation is recent, and the choosers note they are still developing an individual and collective appropriation of the new machine, as referred by one of the choosers in the collective interview:

'I cannot set all the smells apart yet, there are several smells, that smell from greenness … Well, now I know, it's green, it's dry straw. Now, mold is like this, when we smell it we put it immediately aside [rejects], *but there are softer smells, the chocolate, the vanilla… Or the caramel, you even want to bite* [the stopper]' (Ch6).

4. Discussion

Two distinct questions support our discussion. How does technique make body with the worker (Ribault 2011)? Which risks and which limits in the use of the body, in a context of activity mediated by automated machines, are under debate in the construction of effective technical acts?

Our findings show how the work reality is perceived differently after a technique is embodied. One becomes sensitive to different sounds, smells, textures. Body techniques in each of the analysed activities evolved according to technological change, cork quality changes, and change in the relationship with others.

As far as men are concerned, the visibility of their technical act may have contributed to reveal the potentialities of preserving their activity automation-free; in turn, concerning women, the fact that their technical acts are performed in silence - in the silence of the senses - allowed automation potentialities to be enhanced. The introduction of automation in the case of the choosers is contributing, in the end, to reinforce the silence of their technical acts.

4.1. Bodies and gendered technical acts

In the technical act the whole body is involved. Technique and human being become one body (Ribault 2011): for example, the combination between the rhythm of the hand sliding the cork strip on the drill and the rhythm of the foot that starts it, in the case of the punching operators; the multisensorial integration (Jouanneaux 2011), in the case of the choosers.

Getting the haul sets the work pace, the hand grabs one of the sides of the strip intentionally, in order to maximise its use, while at the same time managing to take stoppers from the best possible class (the same strip may provide stoppers from different classes, depending on the technical act from each punching operator). It is the hand that grabs, observes and manipulates the cork strip, but the entire body is called to confer stoppers their best possible shape (pulling the strip away from the drill to avoid certain cork defects).

Regarding the choosers, we are addressing hands that grab and touch to feel the texture, to discriminate quality classes and defects. All the senses are involved in the selection process: sight, touch, hearing, smell, and even taste (e.g. the choosers discriminate the food they avoid eating or manipulating, so that it does not interfere in the selection by smell).

These technical acts, carved in the body, also manifest themselves differently. The body action and the body feeling set the activity from punching operators and choosers apart. It is possible to observe and describe the punching operators' technical act, but for the choosers that description is only partially possible. An example thereto is the difficulty to create activity chronicles with observable categories that define the technical acts (e.g. the body hidden dimensions, for instance what is apprehended by the senses, or a combination of different body parts when performing the technical act, whose decisions make it effective). Their technical act is not defined merely by a body movement, it is mostly by a body memory which implies, in tune with Ouellet and Vézina's (2008) observations, know-how that is expressed as knowing 'how to observe', 'how to feel by touch', 'how to listen', or 'how to smell' the cork stoppers. Such a memory is where the perceptual-motor reference points of the activity lie (Ouellet and Vézina 2008), and it concentrates: (i) the senses synthesis and their discrimination; (ii) the synthesis of all prior activities in the cork industrial chain (e.g. the knowledge that some defects come from the cork oak forest and are for that reason related to other uses of the soil); and (iii) a synthesis of the history of evolution in cork defects.

The hand of the choosers that decides upon the stoppers' quality class is only the visible part of a technical act that involves the entire body. It is even more notorious in this case how understanding a technical act makes it necessary to look at it in context, given the constraints that characterise each work situation. One of the constraints comes from the fact that the selection has to be done under the rhythm imposed

by the conveyor belt. As they work on the same conveyor belt, each chooser's technical act always implies a debate, knowing that 'two bodies will not be 'domesticated' in the same way, and they do not combine the same information and constraints' (Schwartz 2011, p. 161, free translation). This is a debate of norms and values: norms, due to the selection criteria regarding each stoppers' class; and values, because they must be aware that it is not only about the use of one's body, but about synchronised bodies facing a rhythm that must be bearable for both of them. It might be said that a body-self also comprises group synchrony: though it is always one's body, part of a singular biography, it incorporates values collectively negotiated (Schwartz 2000).

In such a sector where gender segmentation is strong, the punching operators' technical acts are more exteriorised (and visible) than the choosers'. Even though for women the technical acts are exteriorised through the body, its practice happens in silence. The historical gender-related work segmentation in this sector contributes towards keeping the development of these technical acts as an exclusively female tradition. But this determinant factor related to the gender of the technique interacts with another: automation. Both factors reinforce the invisibility of women's technical acts, compared to men's, in this sector.

Technique has always a historicity dimension, it is not autonomous from the environment, nor from the body that shapes it (Nouroudine 2001). Still, there are interindividual variations for a same technique within the group (e.g. whether to use the tab in the drill, in the case of punching operators), and there is also a debate about them, how others look into differentiated operative modes of the technical acts.

4.2. The valorisation and devaluation of risks associated with the different uses of men's and women's bodies

Work in the cork sector leaves body marks. All the punching operators that participated in this study have suffered a mutilation of the fingers inflicted by the drill. Considering occupational diseases, suberosis is the most typical in this sector, a lung disease caused by exposure to cork dust, usually known as the disease of 'cork male workers' (Winck 2003).

At first, women seemed less exposed to this risk, but concerns with the fulfilment of high-quality standards, given the need to control TCA, led to the introduction of choosing by sniffing. Different effects of this exposure are verbalised by the female workers: dry nose, bleeding, breathing difficulty. However, the subnotification of these health problems persists because the majority are micro- and small-sized enterprises, which are not obliged to arrange supervision of the workers' health by an occupational doctor.

Reference to work accidents or occupational diseases in this sector has implicit a risk notion associated with physical factors, assuming it deals with risk factors interacting with the workers' body. The analyses of the technical acts allow us, on the other hand, to take into consideration other risk factors, often less tangible, with no follow up and frequently underestimated - the risks arising from the uses of the body. What are the boundaries between the mobilisation of the body at work and its degradation (Ribault 2011)? The technical acts integrate know-how of caution (Cru and Dejours 1983) as attempts to manage those boundaries. An example thereto is the alternation of the foot on the drill, in a gesture that minimises tiredness, or the decision to stop the conveyor belt, so the two choosers can help each other in lifting and dumping the bags of stoppers.

The legacy of these technical acts has repercussions in the space/territory where they take place and in time. This raises the question about the responsibility for the preservation of this legacy and its sustainability. The exploration of other ways to give it visibility is thus a pivotal issue (Cunha, Silva, and Lacomblez 2021). This is now an ongoing reflection on how to think about the socialisation of such a legacy: whether it is inscribed in the body-self, how to make it visible and collectively available to the upcoming generation of cork workers, but also for the preservation of the cork district in this specific territory?

4.3. Study limitations

One of this paper's strengths is showing how technological change does not retract the interest for technique and body techniques. On the contrary, it instigates us to better understand them, as demonstrated hereby. In this attempt to understand the technical act and the marks it leaves on the body, our study also reveals a limitation that we have identified. Concretely, it refers to the difficulty in finding statistics about occupational accidents and professional diseases, as such data are not collected and made available on a regular basis. It is included under the scope of the CORK-In research project an analysis of the risks perceived by the workers. A questionnaire will be

used in order to build a picture of the sector and define risk and health impact indicators.

5. Conclusions

To understand the technical acts as acts of valorisation and of devaluation (Schwartz 2000) means that they raise debate in the contexts where they occur and may resist to a devitalisation by automation. It was precisely what happened in Company 2 with the punching operators. Such body techniques are valued and preserved, even if the technical act is always, partly, reinvention (Séris 1994).

Regarding the choosers, their technical acts are less explicit, even though they call for a political stand to challenge the traditional frontiers that define, namely, female and male technical acts (Cunha, Silva, and Macedo 2021). With automated selection, why have not the former divisions of labour diluted? Why does the choosing activity, despite automation, remain an exclusively female activity? The answer to these questions requires a look into the evolution of the technical acts, aiming at compensating the limits of automation, even though it did not prevent the spread of automation in this activity. Paradoxically, the sniffing machine does not smell the stoppers - it warms the stoppers up to a temperature when the choosers can feel the stopper's smell. Smell discrimination was built based on their experience and on the association with familiar smells, so to create a memory that distinguishes good from bad stoppers. The embodiment of these technical acts is not risks-free, although they tend to be devalued in this case, because they correspond to uses (of the different senses) our body permanently does. The impact work has on these women's health still tends to be considered in research as a 'second health' (Messing 2021), or a second-class issue, reinforced by representations that their job is, when compared to men's, a 'light job' (Messing 1998). Setting limits to preserve health is then up to the female workers, like a 'drama of usage of the body-self' (Schwartz 2000).

Finally, having the technical acts as object of analysis also demands a reflection about data collection. It is not simply a description of how it is done, but it is mostly about showing the conditions under which the technical act is performed and which risks the use of the body implies. The analysis from a gender perspective enables the study of the wide variety of technical acts, either they are taken as general (male and female technical acts) or acknowledging the variability of gendered techniques, considering the relationship with the specificities of the tasks assigned to them. If automation enables a renewed interest for the techniques, the challenge posed by our analysis is now to rethink the ways of apprehending, analysing and restoring the techniques, particularly those which are performed in silence.

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