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Serving with masks: a comparative analysis of flight attendants' emotional labor between normal and COVID-19 times

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Abstract

COVID-19 induced significant changes for flight attendants, including reduced onboard service and face mask mandates. This study examined the impact of these changes on flight attendants' emotional labor and the consequences of emotional labor on well-being. Comparing 206 propensity score-matched participants surveyed before and 206 surveyed during COVID-19, results revealed increased negative emotion requirements and greater use of surface and deep acting during COVID-19. While the negative impact of several emotional labor aspects and especially negative emotion requirements was more pronounced, only sensitivity requirements were less straining, and surface acting was less detrimental to job satisfaction compared to pre-COVID-19.

Keywords Emotion work · Emotional labor · Emotional labor requirements · COVID-19 · Comparative study

1 Introduction

In early 2020, a novel infectious disease known as COVID-19 spread across the globe. On March 11, 2020, the World Health Organization (2020) declared COVID-19 a pandemic, profoundly impacting every domain of human life worldwide. Although most individuals infected with the Corona virus SARS-CoV-2 experienced mild to moderate respiratory symptoms and recovered without requiring special treatment, some developed severe symptoms that required hospitalization, often

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in intensive care units (Garg et al. 2020). Older adults and individuals with serious underlying medical conditions were particularly susceptible to severe illness (Guan et al. 2020). As a result, the world faced a global health crisis, leading to more than 7 million of deaths and significant long-term societal consequences (Wise 2023).

To combat the massive health consequences directly caused by COVID-19 (Perlman 2020), governments implemented extensive measures, including lockdowns, social distancing, and trade restrictions. Despite the fact that these repeated interventions up to the end of 2022 have prevented even higher death rates (Sun et al. 2022), they have disrupted almost all aspects of daily life and significantly impacted the labor market (Barua 2020). Many industries were forced to reduce expenses and secure economic viability (Sharma et al. 2020). For example, 80% of employees in the United Kingdom reported being temporarily furloughed in spring 2020 (Osborne 2020).

Given its focus on interaction with customers, clients, or patients (Mills and Margulies 1980), the service industry was particularly affected by COVID-19 measures (Xiang et al. 2021). Even as businesses reopened, social distancing and mask-wearing made customer interactions difficult (Hofmann et al. 2021). Travel was especially complicated due to requirements for valid COVID-19 test results and proof of vaccination. Even though meta-analyses and reviews show that these measures effectively reduced the spread of COVID-19 (e.g., Ayouni et al. 2021; Liu et al. 2021), they were not universally accepted. A meta-analysis by Wang et al. (2021), for instance, found that the vaccination willingness rate was about 73%, indicating that a considerable portion of the population remained hesitant or unwilling to receive the vaccine and resistant to persuasion (Voss et al. 2024). Many of these also viewed COVID-19 measures as infringements on their civil liberties (Siegrist et al. 2021).

Thus, the airline industry was severely impacted by COVID-19 (Sobieralski 2020). Restrictions such as temporary shutdowns forced airlines to cancel numerous flights (Suau-Sanchez et al. 2020) and downsize their workforce (Sobieralski 2020), prompting efforts to regain passengers. Additionally, COVID-19 measures introduced several inconveniences for passengers that flight attendants had to manage. Onboard services were curtailed, both passengers and crew were required to wear masks throughout the flight, and the crew had to ensure strict adherence to hygiene rules. It can be assumed that flight attendants frequently encountered passengers who opposed COVID-19 measures, leading to confrontations during flights. Consequently, social interactions between flight attendants and passengers probably became more challenging. This study aims to understand how COVID-19 altered flight attendants' work by focusing on the concept of emotional labor (Hochschild 1983), a core demand of this occupation.

Years of research have shown that emotional labor is linked to negative consequences for employee well-being (Hülshager and Schewe 2011; Mesmer-Magnus et al. 2012; Kammeyer-Mueller et al. 2013). However, it is not yet clear how COVID-19 and related measures have affected the way flight attendants engage in emotional labor, or how these changes have impacted the well-being consequences of emotional labor. For this reason, the present study examines whether the levels of specific demands associated with emotional labor (Morris and

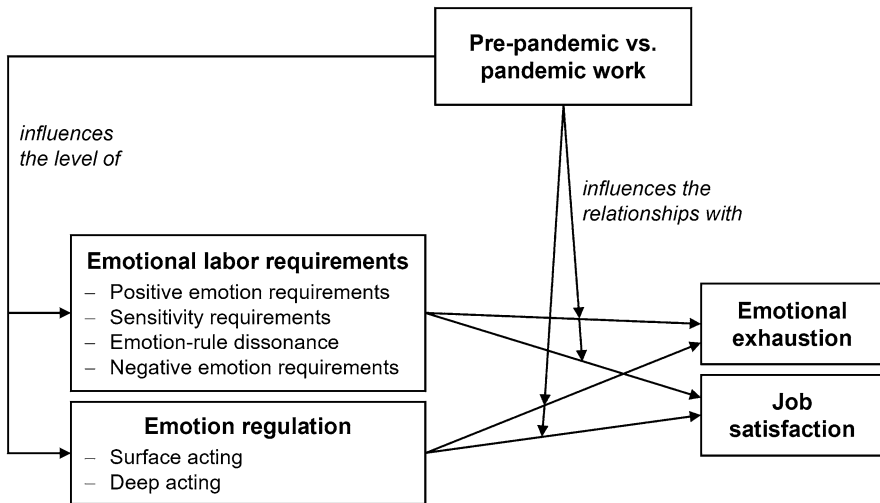


Fig. 1 Conceptual research model

Feldman 1996; Zapf et al. 1999; Kern et al. 2021) and the use of emotion regulation strategies (surface acting and deep acting; Grandey 2000) have changed during COVID-19. Thus, we compare a cross-sectional sample of flight attendants collected during COVID-19 with a sample from the same population collected before COVID-19. To ensure the validity of comparisons and minimize sampling bias, we apply propensity score matching (Thoemmes 2012). Specifically, we account for key demographic variables and the Big Five personality traits, allowing us to create comparable samples and attribute observed differences more confidently to the effects of COVID-19. We also investigate whether the negative relationships of emotional labor requirements and regulation strategies with employee well-being were more negatively pronounced during COVID-19 than before it (see Fig. 1). We consider two outcome variables as indicators of well-being, namely job satisfaction and emotional exhaustion.

In doing so, this study contributes to existing service research in the following ways: first, it is one of the first studies that systematically considers constraints for successful emotional labor caused by COVID-19 measures. It thus complements research that has addressed how certain protective measures interfered with one's work (e.g., Antino et al. 2022; Yeo and Li 2022). Second, in contrast to research that has mostly focused on the requirement to show positive emotions, our study takes a broader perspective and examines both positive and negative emotion requirements, as well as sensitivity requirements and emotion-rule dissonance (Zapf and Holz 2006). Finally, by utilizing identical measures across both pre- and during-COVID-19 samples, collecting data from the same population, and employing propensity score matching to approximate a randomized controlled trial—an approach necessitated by the unforeseen nature of COVID-19—our research design is close to a quasi-experimental design and allows us to validly attribute differences in emotional labor to the impact of COVID-19.

Next, we begin with a literature review on emotional labor and emotion regulation in the service sector. We spotlight specific emotional labor requirements (2.1) and regulation strategies (2.3), outlining reasons for potential differences in levels during COVID-19 (2.2 and 2.4). In Sects. 2.5–2.8, we discuss the relationships between these variables and employee well-being and consider whether changes in these relationships can be expected during COVID-19.

2 Literature review on emotional labor and hypothesis development

When interacting with customers, airlines, along with other service organizations, expect their employees to provide courteous and friendly service (Bowen and Schneider 2014). To meet this demand, employees engage in emotional labor (Hochschild 1983), or emotion work (Zapf 2002), as an integral part of their job role (Rafaeli and Sutton 1987). Flight attendants exemplify typical emotion workers, as Hochschild (1983) has already noted. She defined emotional labor as the “management of feeling to create a publicly observable facial and bodily display [that is] sold for a wage and therefore has exchange value.” (p. 7). Typically, two aspects can be distinguished (see Fig. 1): Emotional labor as a work requirement and emotional labor as a work process (Brotheridge and Grandey 2002; Zapf et al. 2021). Emotional labor requirements stem from organizational expectations and delineate the range of emotions that employees should exhibit toward customers (Diefendorff and Richard 2003). These expectations may be embedded in organizational culture or articulated through explicit display rules (Rafaeli and Sutton 1987; Zapf et al. 2021). The process of emotional labor refers to the effort employees make to meet emotional labor requirements in their roles. When employees’ inner feelings do not align with the required emotional displays, they must either fake the required emotions (called surface acting) or adjust their inner feelings to match the expectations (called deep acting; Grandey 2000). Next, we outline the specific emotional labor requirements pertinent to flight attendants’ jobs and examine whether COVID-19 has altered the extent to which these requirements were present in their work.

2.1 Emotional labor requirements

Emotional labor requirements are often grouped into the requirement to display positive, negative, or neutral emotions (Zapf et al. 1999; Fischbach et al. 2006), as well as the requirement to suppress emotions, primarily negative ones (Brotheridge and Grandey 2002; Grandey and Gabriel 2015). The *requirement to express positive emotions* toward customers is an inherent aspect of the job role for most service employees (Zapf 2002; Diefendorff and Richard 2003), including flight attendants. By engaging in positive emotional displays, employees contribute to customer satisfaction and thus to the success of the organization (Hennig-Thurau et al. 2006; Hülshager and Schewe 2011). This is because positive emotions expressed by the employee positively impact customers’ affective states, resulting in higher ratings of service quality (Pugh 2001). In addition to maintaining a friendly demeanor,

flight attendants are required to accurately assess passengers' emotional states. This understanding enables them to adapt their behavior to effectively address the passengers' needs and concerns (Côté 2005). An example is when a passenger who is afraid of flying needs to be reassured. Zapf et al. (1999) refer to this as *sensitivity requirements*.

For flight attendants, these two emotional labor requirements are predominant. Even when positive emotions are not genuinely felt—such as when addressing passengers dissatisfied with their food or making excessive demands—airlines still expect attendants to stay friendly and polite. In such situations, flight attendants' actual feelings might be neutral or negative, but they are still expected to express positive emotions. This mismatch between the emotions expected and those actually felt is known in the literature as *emotion-rule dissonance* (Holman et al. 2008).

While it is generally deemed appropriate to suppress negative emotions and express positive ones, controlled expression of negative emotions toward customers may become necessary in challenging or perilous situations (Zapf 2002; Humphrey et al. 2008). For instance, reprimanding customers for disregarding safety instructions may require displaying negative emotions to underscore the seriousness of the situation and foster obedience (Humphrey et al. 2008). Such *negative emotion requirements* are considered rarely in research, probably because they are usually restricted to certain professions, including bill collectors, police officers, funeral directors, or doormen (Rafaeli and Sutton 1987; Sutton 1991; Zapf 2002). However, since flight attendants' primary responsibility is to ensure passenger safety, we believe it is crucial to consider this demand.

2.2 Changes in emotional labor requirements due to COVID-19 measures onboard

There are several reasons why emotional labor requirements of flight attendants may have changed during COVID-19. However, the direction of these changes is not always clear, as arguments can be made for both increases and decreases. Consequently, we have formulated research questions rather than hypotheses for these uncertain scenarios.

On the one hand, airlines curtailed onboard services, such as eliminating meal service, which led to fewer interactions with passengers (Zahraee et al. 2023). In addition, aligning with the social distancing rule, flight attendants were instructed to prioritize safety and regulatory compliance over engaging in extensive customer care. This reduction in service interactions likely decreased the frequency of positive emotion requirements, sensitivity requirements, as well as instances where the required emotions did not align with attendants' genuine feelings (i.e., emotion-rule dissonance). Another factor contributing to reduced requirements is the mandate for both crew and passengers to wear face masks (Zahraee et al. 2023). Masks obscure facial cues essential for accurately reading emotional states, thus impairing the recognition of emotions (e.g., Grundmann et al. 2021). The diminished acoustic signals and the absence of visual signals via the lips diminish the ability of employees to perceive and respond to emotional cues, potentially leading to a reduced emphasis

on emotional expressions and sensitivity (Carbon 2020). In turn, employees might also be less impacted by negative emotions from customers when wearing face masks, leading to a reduction in emotion-rule dissonance, except in cases where customer emotions were exceptionally intense. This suggests that positive emotion requirements, sensitivity requirements, as well as emotion-rule dissonance were lower during COVID-19 than before.

On the other hand, the reduced number of flights might have heightened employees' motivation to engage in emotional labor, as they were "allowed to work" during a period of significant cutbacks. Many flight attendants are drawn to their profession precisely because of its emotional labor demands, which are integral to the role (Trumpold et al. 2021). With fewer flights available, attendants may have been inclined to put extra effort into emotion work during the rare opportunities they had, aiming to enhance customer satisfaction and contribute to their employer's survival, thereby also protecting their own job security. For example, a study by Xiao et al. (2022) found that flight attendants with high career orientation were more likely to positively reappraise their situation during COVID-19, which, in turn, led to improved performance. Thus, COVID-19 may have led employees to seek out moments of positive interaction whenever possible. Additionally, with a reduction in service-related tasks, employees might have had more capacity to focus on emotional labor, potentially increasing their engagement in positive emotion requirements, sensitivity requirements, and managing emotion-rule dissonance.

Given these competing theoretical assumptions, both increases and decreases in emotional labor demands are plausible. Therefore, we pose the following research questions.

Research Question 1 Did positive emotion requirements change during COVID-19?

Research Question 2 Did sensitivity requirements change during COVID-19?

Research Question 3 Did emotion-rule dissonance change during COVID-19?

Regarding the requirement to express negative emotions, the situation is clearer. Typically, instances requiring the expression of negative emotions toward customers are rare, as noted in previous studies on flight attendants (Kern et al. 2021). However, given that approximately one-fourth of people resisted COVID-19 measures, including mask-wearing (Sinicrope et al. 2021), these passengers might perceive mask mandates as a threat or infringement on their freedom, potentially triggering reactance (Steindl et al. 2015). This could have increased the need for flight attendants to display negative emotions, particularly when enforcing hygiene requirements. That means that such—usually safety-related—situations are assessed in such a way that feigned positive emotions (emotion-rule dissonance) do not do justice to the seriousness of the situation and therefore the controlled display of negative emotions is seen as a correct and legitimate requirement. The reduction in onboard services is unlikely to impact this requirement, as negative emotions are generally unrelated to service activities. Therefore, we propose:

Hypothesis 1 Flight attendants report higher requirements to display negative emotions toward passengers during COVID-19 as compared to before.

2.3 The process of emotional labor: emotion regulation

To meet emotional labor requirements, employees can either defy display rules and show their true emotions or strive to regulate their emotions in accordance with organizational expectations and the prescribed display rules (Rafaeli and Sutton 1987; Zapf et al. 2021). Research suggests that employees tend to exhibit deviant emotions only in exceptional cases (Tschan et al. 2005; Trumpold et al. 2021). Instead, they try to regulate their emotions and predominantly resort to surface or deep acting to meet the demands placed upon them (Grandey 2000; Holman et al. 2008). *Surface acting* involves modifying the outward expression of emotion to align with the required display rules, while the underlying felt emotions remain unaltered. Conversely, *deep acting* involves the deliberate effort to authentically adjust the felt emotions, resulting in a genuine display of required emotions (Hochschild 1983; Zapf et al. 2021).

2.4 Changes in surface and deep acting due to COVID-19 measures onboard

As previously mentioned, studies indicate that the use of face masks hinders the accurate recognition and categorization of an interaction partner's true emotions (Carbon 2020; Grundmann et al. 2021). Consequently, there may be a delayed or inadequate perception of the need for emotion regulation, resulting in a reduced use of both regulation strategies. Moreover, research demonstrated that wearing a mask diminishes interpersonal closeness (Kastendieck et al. 2022), suggesting that employees may perceive less necessity to regulate emotions in customer interactions. Furthermore, one could assume that the management challenges and deteriorating working conditions during COVID-19 likely increased stress levels among airline employees (Kim et al. 2022; Tam and Trang 2024). As negative stressful situations typically generate negative emotions that are difficult to convert into positive ones (Semmer et al. 2016), engaging in deep acting may become less feasible, making surface acting a more practical approach. This would indicate an increase in surface acting and decrease in deep acting.

Conversely, flight attendants may be motivated to resist the decline in interpersonal closeness (Xiao et al. 2022). Driven by their customer orientation and personal motives (von Gilsa et al. 2014; Trumpold et al. 2021), they might proactively engage in deep acting as a strategy to counteract the perceived reduction in closeness. During COVID-19, when only a few passengers were present, it may have become even more important for flight attendants to enhance customer satisfaction and foster future loyalty by authentically expressing positive emotions (An and Noh 2009), as their efforts contribute to the survival of their employer amid the crisis.

Hence, there appear to be reasons supporting both an increased and decreased use of deep acting and surface acting during COVID-19, rendering the formulation of a hypothesis challenging. Therefore, we examine the following research questions.

Research Question 4a Did the frequency of using surface acting among flight attendants change during COVID-19?

Research Question 4b Did the frequency of using deep acting among flight attendants change during COVID-19?

2.5 Relationships between emotional labor requirements and well-being

Central to research on emotional labor is its impact on employee well-being (see Fig. 1). The consequences of emotional labor can be elucidated through the lens of conservation of resources theory (COR; Hobfoll 1989; Hobfoll et al. 2018), according to which individuals experience stress when valuable resources are under threat, lost, or when there are no compensatory resource gains after investments. Applying these theoretical propositions of COR theory to the four emotion work requirements investigated implies that not all of them are exclusively negative.

For instance, the requirement to display positive emotions, while potentially depleting resources due to regulatory efforts (Baumeister and Vohs 2007), may simultaneously contribute to job satisfaction by fulfilling affiliation needs (Zapf and Holz 2006). Similarly, sensitivity requirements entail a complex interaction of resource expenditure and gain. While meeting these demands can tax an individual's resources, successful engagement often results in personal growth, potentially boosting job satisfaction (Kern et al. 2021). However, the requisite resource investment typically heightens emotional exhaustion (Kammeyer-Mueller et al. 2013).

In contrast, emotion-rule dissonance and the requirement to express negative emotions are viewed as stressors associated strictly with adverse outcomes. This is because such work demands occur in stressful situations, which inevitably trigger negative emotions. Employees have to manage these negative emotions (Semmer et al. 2016), which inherently contributes to exhaustion and diminishes job satisfaction (Totterdell and Holman 2003; Zapf et al. 2021). Moreover, these two requirements seldom yield personal gains (Hülshager and Schewe 2011), intensifying their negative impact on job satisfaction and increasing their impact on exhaustion. Thus, while some emotional labor requirements have ambivalent effects, others are unequivocally taxing.

2.6 Changes in relationships due to COVID-19 measures

COVID-19 can be viewed as a resource-threatening event, as it brought about concerns about job security, while simultaneously introducing new challenges such as alterations in work routines (Hite and McDonald 2020). At the same time, crucial resources, like social support, have been diminished by measures such as social distancing or lockdowns (e.g., Saltzman et al. 2020). As resources are limited in nature (Hobfoll et al. 2018), this implies that employees had fewer resources available for emotional labor during COVID-19. Consequently, one may anticipate more pronounced negative consequences overall.

COVID-19 has not only diminished employees' resource pools but also introduced work-related factors that further threaten these resources. A significant contributor to these challenges is the use of face masks (Hofmann et al. 2021). This reduction in visible emotional cues necessitates greater effort from employees to accurately interpret and respond to customer emotions, thereby intensifying the negative impacts of emotional labor. Moreover, the effort required to express emotions in a way that is perceptible to customers is increased. Additionally, the mutual wearing of masks can hinder accurate emotion recognition (Grundmann et al. 2021), increasing the likelihood of misinterpretations and reducing the chances of successfully meeting emotional labor requirements. Consequently, these conditions make engagements in positive emotion requirements and sensitivity requirements more resource-intensive and potentially more exhausting. Based on Kammeyer-Mueller et al. (2013) and Zapf et al. (1999), we expect:

Hypothesis 2 There is a lower positive or even negative relationship of positive emotion requirements with job satisfaction (a) and an increased positive relationship with emotional exhaustion (b) during COVID-19 as compared to before.

Hypothesis 3 There is a lower positive or even negative relationship of sensitivity requirements with job satisfaction (a) and an increased positive relationship with emotional exhaustion (b) during COVID-19 as compared to before.

Regarding emotion-rule dissonance and the requirement to express negative emotions, the relevance of face masks may be secondary compared to the circumstances in which these demands arise. Both emotion-rule dissonance and negative emotion requirements typically emerge in challenging situations involving negative emotions, such as ensuring compliance with safety regulations (Zapf and Holz 2006; Kern et al. 2021). During COVID-19, non-compliance with COVID-19-related rules may have led to confrontations involving personal attacks on flight attendants, which pose a threat to the self and require substantial emotional regulation (Semmer et al. 2019). Such scenarios, indicative of a resource loss as described by COR theory (Hobfoll et al. 2018), could be exacerbated during COVID-19.

Moreover, flight attendants' resource pools were likely diminished during COVID-19, increasing their vulnerability to resource loss and amplifying the self-threatening nature of situations involving emotion-rule dissonance and the requirement to express negative emotions (Semmer et al. 2019). This vulnerability was further compounded by reduced tolerance among flight attendants toward passengers who repeatedly ignored mask mandates. As a result, the interactions should be even more negative and therefore more stressful. Based on the meta-analysis of Hülshenger and Schewe (2011) and Zapf et al. (1999) who report negative correlations with job satisfaction and positive correlations with exhaustion, we expect:

Hypothesis 4 There is a stronger negative relationship of emotion-rule dissonance with job satisfaction (a) and an increased positive relationship with emotional exhaustion (b) during COVID-19 as compared to before.

Hypothesis 5 There is a stronger negative relationship of negative emotion requirements with job satisfaction (a) and an increased positive relationship with emotional exhaustion (b) during COVID-19 as compared to before.

2.7 Relationships between emotion regulation and well-being

Surface and deep acting should also be related to job satisfaction and emotional exhaustion, but in distinct ways. Meta-analyses have shown that surface acting is associated with impaired well-being (Hülsheger and Schewe 2011; Mesmer-Magnus et al. 2012). The negative consequences of surface acting can be attributed to the resource depletion involved in faking emotional expressions (Baumeister et al. 1998), the dissonance between emotions shown and felt (Hülsheger and Schewe 2011), and the sense of inauthenticity employees experience (Grandey et al. 2005).

In contrast, deep acting involves efforts to align inner feelings with the required emotional displays, which can be more sustainable and less psychologically costly (Mesmer-Magnus et al. 2012). It has been shown to have only weak relationships with exhaustion and job satisfaction (Grandey 2000; Hülsheger and Schewe 2011), likely because it reduces state emotional dissonance and fosters a sense of authenticity (Pugh et al. 2011), despite requiring effort (e.g., Liu et al. 2008). Thus, while both strategies aim to meet organizational emotional display rules, deep acting tends to yield more favorable outcomes for employee well-being compared to surface acting.

2.8 Changes in relationships between emotion regulation and well-being due to COVID-19 measures

The mechanisms explaining the consequences of surface acting may have changed during COVID-19. As service providers were required to wear masks as well, we expect that more effort was needed to ensure that the emotion shown reaches the customer despite the mask. To ensure that smiles remain discernible under face masks, individuals must engage the muscles around the eyes, a facial expression known as the ‘Duchenne smile’ according to Ekman (1989). Consequently, a person needs to exert more conscious effort in their positive emotional displays, such as explicitly involving the muscles around the eyes (Hofmann et al. 2021) or altering their tone of voice (Marler and Ditton 2021). The exaggerated expression of emotion highlights the discrepancy between emotion shown and emotion felt, thereby amplifying the negative consequences of surface acting. Thus, we posit:

Hypothesis 6 There is a stronger negative relationship of surface acting with job satisfaction (a) and an increased positive relationship with emotional exhaustion (b) during COVID-19 as compared to before.

Furthermore, COVID-19 likely influenced the consequences of deep acting. We expect that increased effort was required to convey emotions to customers during COVID-19, accelerating the depletion of resources in line with COR theory (Hobfoll

et al. 2018). In addition, resource gains are less likely to occur, as customers wearing masks prevent employees from experiencing the success of their emotion regulation (Lilius 2012) through positive customer reactions (Grundmann et al. 2021). This imbalance between resource gains and losses likely leads to more pronounced negative consequences of deep acting.

Hypothesis 7 There is a weaker positive or even negative relationship of deep acting with job satisfaction (a) and an increased positive relationship with emotional exhaustion (b) during COVID-19 as compared to before.

3 Method

3.1 Sample and data collection

Both samples were collected in Germany via identical recruitment channels using a convenience sampling approach. The data for the pre-pandemic sample were collected between May and June 2017 as part of a Master thesis (Winkler 2017), comprising 280 participants, of whom 83.9% ($n=235$) were women. Participants' ages ranged from 18 to 58 years, with a mean age of 35.52 ($SD=10.57$). On average, participants reported 11.09 years of work experience ($SD=8.97$), with a range from 1 to 35 years. Approximately 65% ($n=182$) primarily flew long-distance, as opposed to short-distance flights. Flight attendants without leadership responsibilities constituted the majority of the sample (77.0%, $n=214$), with only 23.0% ($n=66$) being pursers.

During COVID-19, we resurveyed the same group of flight attendants from the same airlines using the same questionnaire. Additionally, we assessed job loss insecurity (O'Neill and Sevastos 2013) as a control variable to ensure that any differences in emotion work could not be solely attributed to variations in levels of job insecurity. Data were collected in March and April 2021, during a period of significant restrictions in Germany, from a sample of 206 participants, of which 85.0% ($n=175$) were women. One individual identified as diverse in terms of gender. Participants' ages ranged from 20 to 60 years, with a mean age of 36.56 ($SD=11.05$). Work experience averaged 12.46 years ($SD=10.05$) and ranged from 2 to 36 years. Approximately 68.4% of participants ($n=141$) reported primarily flying long-distance flights. The majority (84.0%, $n=173$) worked as flight attendants and 16.0% ($n=33$) as pursers.

Since COVID-19 was unforeseen, implementing a controlled experimental design was not feasible. To ensure a valid comparison between the pre-pandemic and pandemic samples, we applied propensity score matching—a statistical technique designed to approximate the conditions of a randomized controlled trial by achieving equivalence across groups (Lane et al. 2012). The underlying principle of propensity score matching is to balance selected covariates (in our case, sociodemographics and personality traits) by matching participants based on a single score—the propensity score, which reflects the probability of group assignment given the observed covariates.

Propensity scores were calculated in SPSS using logistic regression, with age, gender, organizational tenure, leadership role, and the Big Five personality traits (neuroticism, extraversion, openness, agreeableness, and conscientiousness) as predictors. Personality traits were assessed using the 10-item measure developed by Gosling et al. (2003) to control for potential selection and non-response biases, which may have varied due to COVID-19-related conditions.

The matching procedure was conducted using the SPSS propensity score matching module (Thoemmes 2012; Huang et al. 2015), as was done, for example, by Lane et al. (2012). We employed a nearest neighbor matching approach with a one-to-one matching ratio, ensuring that each participant in the pandemic sample was paired with the most similar participant from the pre-pandemic sample. A caliper of 0.10 standard deviations of the propensity score was set as the maximum allowable distance between matched pairs to ensure high-quality matches (Zhao et al. 2021). Of the 280 participants in the pre-pandemic sample, 206 were successfully matched to the 206 participants in the pandemic sample, achieving the maximum possible matching given the available data in the COVID-19 group.

Table 1 provides an overview of all demographic information for the matched samples. A comparison of the pre-COVID-19 sample characteristics before and after the matching procedure is provided in Table S1 of the Supplements. To evaluate the effectiveness of the matching procedure, as recommended by Thoemmes and Kim (2011), independent *t*-tests were conducted. The results indicated no significant differences between the two samples in terms of demographic variables, including gender ($p=0.70$), age ($p=0.14$), organizational tenure ($p=0.25$), and leadership role ($p=0.24$). Similarly, no significant differences were observed for four of the five personality traits: extraversion ($p=0.48$), openness ($p=0.29$), agreeableness ($p=0.18$), and conscientiousness ($p=0.29$). However, a small but significant difference was found for neuroticism ($M_{\text{pre-pandemic}}=2.17$ vs. $M_{\text{pandemic}}=2.39$, $p=0.01$). Nonetheless, the effect size (Cohen's $d=0.27$) indicates a small difference, suggesting that the propensity score matching was largely successful.

3.2 Measures

Identical measures were used across both samples. All measures were previously published in German, and thus, we utilized the corresponding validated German items. The full list of items is provided in Table S2 of the Supplements, with the exception of those for surface acting, deep acting, job satisfaction, and job loss insecurity due to copyright restrictions. Here, sample items are reported. Table 2 shows the means, standard deviations, internal consistencies, and bivariate correlations among all study variables. Table S3 of the Supplements shows the descriptive statistics of the pre-pandemic sample before propensity score matching. Positive emotion requirements (four items), sensitivity requirements (three items), emotion-rule dissonance (four items), and negative emotion requirements (five items) were measured with the corresponding scales from the Frankfurt Emotion Work Scale in its validated German version (FEWS; Zapf et al. 1999). In the original version of the instrument, one or two items from each scale used a different response format,

Table 1 Demographic information about the respondents

| Variable | Pre-pandemic sample | | Pandemic sample | |
|------------------------------|---------------------|----------------|-----------------|----------------|
| | Frequency | Percentage (%) | Frequency | Percentage (%) |
| Gender | | | | |
| Male | 35 | 17.0 | 30 | 14.6 |
| Female | 171 | 83.0 | 175 | 85.0 |
| Age | | | | |
| 20 and younger | 6 | 2.9 | 1 | 0.5 |
| 21–25 | 39 | 18.9 | 32 | 15.5 |
| 26–30 | 45 | 21.8 | 54 | 26.2 |
| 31–35 | 28 | 13.6 | 25 | 12.1 |
| 36–40 | 26 | 12.6 | 23 | 11.2 |
| 41–45 | 20 | 9.7 | 18 | 8.7 |
| 46–50 | 22 | 10.7 | 16 | 7.8 |
| 51–55 | 15 | 7.3 | 24 | 11.7 |
| 56 and older | 5 | 2.4 | 13 | 6.3 |
| Airline tenure | | | | |
| 5 and fewer | 79 | 38.4 | 83 | 40.3 |
| 6–10 | 52 | 25.2 | 46 | 22.3 |
| 11–15 | 13 | 6.3 | 19 | 9.2 |
| 16–20 | 32 | 15.5 | 11 | 5.3 |
| 21 and more | 30 | 14.6 | 47 | 22.8 |
| Contract | | | | |
| Full-time | 102 | 49.5 | 114 | 55.3 |
| Part-time | 104 | 50.5 | 92 | 44.7 |
| Primary flight types | | | | |
| Short-haul flights | 66 | 32.0 | 65 | 31.6 |
| Long-haul flights | 139 | 67.5 | 141 | 68.4 |
| Position | | | | |
| Flight attendant | 161 | 78.2 | 173 | 84.0 |
| Purser on short-haul flights | 16 | 7.8 | 12 | 5.8 |
| Purser on long-haul flights | 10 | 4.9 | 4 | 1.9 |
| Purser on all flights | 19 | 9.2 | 17 | 8.3 |
| Total sample | 206 | | 206 | |

Propensity score-matched pre-pandemic sample shown

prompting participants to compare two workplaces and rate which one is more similar to theirs. We excluded these items because a study by Kern et al. (2021), which analyzed data from 33 primary studies involving about 8,000 participants, showed that they considerably reduced scale reliability. The used items were all rated on a 5-point scale ranging from 1 = *very rarely/never* to 5 = *very often*. Surface acting (three items) and deep acting (five items) were assessed using the German versions of the scales developed by Grandey (2003), as used in Bechtoldt et al.'s (2011)

Table 2 Means, standard deviations, internal consistencies and correlations in both samples

| Variable | M_{pre} | M_{pan} | SD_{pre} | SD_{pan} | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----------------------------------------------------|-----------|-----------|------------|------------|---------|---------|--------|--------|--------|---------|---------|---------|---------|---------|
| 1 Age | 35.00 | 36.56 | 10.57 | 10.05 | | 0.03 | -0.04 | 0.04 | -0.14* | -0.10 | -0.17* | -0.28** | 0.12 | 0.01 |
| 2 Gender (1 = <i>female</i> , 2 = <i>male</i>) | 1.17 | 1.16 | 0.38 | 0.38 | 0.15* | | -0.07 | -0.12 | -0.01 | 0.03 | 0.13 | -0.05 | -0.07 | -0.03 |
| 3 Positive emotion require- ments | 4.13 | 4.12 | 0.65 | 0.65 | -0.02 | -0.04 | | 0.33** | 0.42** | > .01 | 0.19** | 0.24** | -0.03 | 0.20** |
| 4 Sensitivity requirements | 4.12 | 4.17 | 0.72 | 0.68 | -0.03 | 0.09 | 0.36** | | 0.19** | < .01 | 0.05 | 0.22** | 0.10 | 0.09 |
| 5 Emotion-rule dissonance | 3.36 | 3.22 | 0.86 | 0.88 | -0.13 | -0.03 | 0.41** | 0.21** | | 0.27** | 0.51** | 0.12 | -0.27** | 0.24** |
| 6 Negative emotion require- ments | 1.98 | 2.10 | 0.60 | 0.66 | 0.02 | 0.07 | 0.22** | 0.05 | 0.27** | | 0.14* | 0.03 | -0.22** | 0.11 |
| 7 Surface acting | 2.19 | 2.34 | 0.84 | 0.98 | 0.06 | 0.04 | 0.21** | 0.14 | 0.42** | 0.23** | | 0.24** | -0.31** | 0.25** |
| 8 Deep acting | 2.51 | 2.73 | 0.99 | 1.11 | -0.05 | -0.05 | 0.12 | 0.25** | 0.20** | 0.06 | 0.40** | | 0.10 | 0.14 |
| 9 Job satisfaction | 5.17 | 5.11 | 1.02 | 0.89 | -0.01 | -0.05 | -0.06 | < .01 | -0.33 | -0.28** | -0.35** | -0.09 | | -0.33** |
| 10 Emotional exhaustion | 2.46 | 2.87 | 0.85 | 0.75 | -0.15* | -0.04 | 0.11 | -0.03 | 0.30** | 0.24** | 0.31** | 0.18** | -0.39** | |
| 11 Job loss insecurity | — | 3.32 | — | 0.86 | -0.25** | -0.18** | 0.06 | 0.07 | 0.13 | -0.01 | 0.21** | 0.22** | -0.24** | 0.21** |

Correlations above the diagonal refer to the pre-pandemic sample. Correlations below the diagonal refer to the pandemic sample. Pre = propensity score-matched pre-pandemic sample. Pan = pandemic sample. $N_{pre-pandemic} = 206$, $N_{pandemic} = 206$

* $p < .05$. ** $p < .01$. *** $p < .001$ (two-tailed)

study. Items were answered on a 5-point scale ranging from 1 = *never* to 5 = *often*. Job satisfaction was assessed using the corresponding German scale from the questionnaire on life satisfaction (Fahrenberg et al. 2000). It consists of seven items that were rated on a 7-point scale from 1 = *very unsatisfied* to 7 = *very satisfied*. Emotional exhaustion was measured with three items from the Copenhagen Psychosocial Questionnaire in the German validated version (Nuebling and Hasselhorn 2010). In this paper, the version of 2017 was used. Participants were asked to rate how often the statements about how they felt applied to them on a 5-point scale from 1 = *never* to 5 = *always*.

In the COVID-19 sample, we additionally measured job loss insecurity as a control variable with the six-item scale by O'Neill and Sevastos (2013). Items were answered on a 5-point scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

3.3 Statistical analysis

Before testing our hypotheses, we assessed the reliability and validity of all measures. We then proceeded with hypothesis testing using SPSS 29 and Mplus 8.8. To test changes in emotional labor requirements and the use of emotion regulation strategies (RQ1–4 and H1), *t*-tests for independent samples were calculated. When the assumption of homogeneity of (residual) variances was not met, Welch's *t*-test was used instead (Table 4). For Hypotheses 2–7, we conducted linear regression analyses using factor scores derived from the confirmatory factor analyses (Devlieger and Rosseel 2017). To examine the significant differences in the regression coefficients, *z*-scores were computed by calculating the absolute value of the differences between both β/SE coefficients and comparing them to the one-tailed critical *z*-value of 1.645.

4 Results

4.1 Measurement model and preliminary analysis

A confirmatory factor analysis was conducted for each sample to evaluate the reliability and discriminant validity of the scales. Table 3 presents the model fit indices for the matched samples, including χ^2 , degrees of freedom (*df*), χ^2/df ratio, Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI) as per Schermelleh-Engel et al. (2003). Additionally, the table reports factor loadings, composite reliabilities (CR; Peterson and Kim 2013; Cho and Kim 2015), also known as McDonald's (1999) omega, average variance extracted (AVE) and the heterotrait–monotrait (HTMT; Henseler et al. 2015) ratios. Composite reliability, preferred over Cronbach's alpha, was used as it does not assume tau-equivalence or uniform item variance (Cho and Kim 2015). Values above 0.70 indicate satisfactory reliability. HTMT assesses discriminant validity by comparing heterotrait correlations (correlations between items of different constructs) with monotrait correlations (correlations among items of the same construct). Discriminant validity is supported

Table 3 Results of confirmatory factor analysis

| Scale | Item | Pre-pandemic | | | | Pandemic | | | |
|-------------------------------|-------------------------------------------------------------|-----------------|------|------|------|-----------------|------|------|------|
| | | Factor loadings | CR | AVE | HTMT | Factor loadings | CR | AVE | HTMT |
| Positive emotion requirements | PER1: display pleasant emotions toward customers | 0.58 | 0.69 | 0.36 | 0.60 | 0.56 | 0.69 | 0.36 | 0.60 |
| | PER2: put customers in a positive mood | 0.66 | | | | 0.58 | | | |
| | PER3: display various positive emotions toward customers | 0.59 | | | | 0.67 | | | |
| | PER4: appear positive when dealing with customers | 0.57 | | | | 0.60 | | | |
| Sensitivity requirements | SER1: empathize with customers | 0.73 | 0.86 | 0.67 | 0.82 | 0.80 | 0.84 | 0.64 | 0.80 |
| | SER2: know customers feel | 0.87 | | | | 0.75 | | | |
| | SER3: put oneself in customers' shoes | 0.85 | | | | 0.85 | | | |
| | ERD1: suppress emotions to appear neutral | 0.71 | 0.87 | 0.62 | 0.79 | 0.55 | 0.82 | 0.54 | 0.73 |
| Emotion-rule dissonance | ERD2: display emotions that do not agree with feelings | 0.80 | | | | 0.76 | | | |
| | ERD3: display emotions while actually feeling indifferent | 0.75 | | | | 0.72 | | | |
| | ERD4: display emotions that do not agree with true feelings | 0.89 | | | | 0.88 | | | |
| | NER1: display unpleasant emotions | 0.63 | 0.74 | 0.37 | 0.61 | 0.78 | 0.78 | 0.43 | 0.66 |
| Negative emotion requirements | NER2: put customer in negative mood | 0.44 | | | | 0.33 | | | |
| | NER3: display various negative emotions | 0.80 | | | | 0.87 | | | |
| | NER4: finding oneself in negative mood | 0.62 | | | | 0.57 | | | |
| | NER5: act very stern and strict toward customers | 0.48 | | | | 0.59 | | | |
| Surface acting | SA1: put on an act to deal with customers appropriately | 0.61 | 0.85 | 0.53 | 0.73 | 0.64 | 0.88 | 0.61 | 0.78 |
| | SA2: fake being in a good mood | 0.83 | | | | 0.83 | | | |
| | SA3: pretend to have the emotions required | 0.49 | | | | 0.69 | | | |
| | SA4: just pretend to have the emotions needed | 0.80 | | | | 0.85 | | | |
| | SA5: put on a show | 0.86 | | | | 0.86 | | | |

Table 3 (continued)

| Scale | Item | Pre-pandemic | | | | Pandemic | | | |
|----------------------|-------------------------------------------------------|-----------------|------|------|------|-----------------|------|------|------|
| | | Factor loadings | CR | AVE | HTMT | Factor loadings | CR | AVE | HTMT |
| Deep acting | DA1: try to actually experience the required emotions | 0.65 | 0.85 | 0.66 | 0.81 | 0.70 | 0.87 | 0.70 | 0.83 |
| | DA2: make an effort to feel the required emotions | 0.99 | | | | 0.98 | | | |
| Job satisfaction | DA3: work hard to feel the emotions needed | 0.74 | | | | 0.81 | | | |
| | JS1: job position | 0.74 | 0.82 | 0.40 | 0.63 | 0.81 | 0.84 | 0.43 | 0.66 |
| | JS2: security of job in future | 0.56 | | | | 0.35 | | | |
| | JS3: success experiences | 0.64 | | | | 0.79 | | | |
| | JS4: promotion possibilities | 0.49 | | | | 0.67 | | | |
| | JS5: organizational climate | 0.63 | | | | 0.65 | | | |
| | JS6: extent of job demands and burdens | 0.70 | | | | 0.61 | | | |
| Emotional exhaustion | JS7: variety that job offers | 0.60 | | | | 0.63 | | | |
| | EE1: feel worn out | 0.62 | 0.75 | 0.50 | 0.70 | 0.53 | 0.79 | 0.57 | 0.76 |
| | EE2: physically exhausted | 0.77 | | | | 0.72 | | | |
| | EE3: emotionally exhausted | 0.71 | | | | 0.96 | | | |
| χ^2 | | 767.22 | | | | 687.90 | | | |
| <i>df</i> | | 498 | | | | 498 | | | |
| χ^2/df | | 1.54 | | | | 1.38 | | | |
| RMSEA | | 0.051 | | | | 0.043 | | | |
| CFI | | 0.896 | | | | 0.931 | | | |

Propensity score-matched sample used for confirmatory factor analysis

CR Composite reliability, AVE Average variance extracted

Table 4 Independent samples t-tests comparing pre-pandemic and pandemic group using factor scores

| Variable | Pre-pandemic | | Pandemic | | Mean score comparison | | | Test result |
|----------|--------------|-----------|----------|-----------|-----------------------|----------|------------------|------------------------------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>t</i> | <i>p</i> | Cohen's <i>d</i> | |
| RQ1 | 4.13 | 0.87 | 4.10 | 0.82 | 0.370 | 0.712 | 0.04 | No difference |
| RQ2 | 4.12 | 0.93 | 4.21 | 0.88 | -1.060 | 0.290 | -0.10 | No difference |
| RQ3 | 3.36 | 0.95 | 3.25 | 0.94 | 1.217 | 0.224 | 0.12 | No difference |
| H1 | 1.98 | 0.89 | 2.26 | 1.18 | -2.745 | 0.003 | -0.27 | Support |
| RQ4a | 2.19 | 0.94 | 2.46 | 1.14 | -2.589 | 0.010 | -0.26 | Higher level during COVID-19 |
| RQ4b | 2.51 | 1.00 | 2.73 | 1.06 | -2.184 | 0.030 | -0.22 | Higher level during COVID-19 |

Propensity score-matched sample used for mean comparisons. *p* is reported one-tailed for H1 and two-tailed for all research questions (RQ). $N_{pre-pandemic} = 206$, $N_{pandemic} = 206$

^a Welch test is reported because Levene's test indicated that the homogeneity of variances assumption was not met

if the HTMT ratio is smaller than 0.85 (Henseler et al. 2015). Overall, the results demonstrate adequate reliability and validity for the scales employed. The χ^2/df ratio and RMSEA indicated a good model fit, while the CFI, although slightly lower, remained around 0.90, which is considered the lower bound of an acceptable fit. Factor loadings were above or close to 0.50, except for one item (NER2). Reliability measures are predominantly satisfactory, with most values exceeding 0.80; however, the composite reliability for the positive emotions requirement slightly fell short of the 0.70 threshold. All HTMT values were below 0.85, confirming sufficient discriminant validity.

4.2 Changes in emotional labor requirements

First, we compared the four types of emotional labor requirements (see Fig. 1) across the pre-COVID-19 and COVID-19 periods. Results are shown in Table 4. For positive emotion requirements, sensitivity requirements, and emotion-rule dissonance (Research Questions 1, 2, and 3), there were no significant differences between the groups. However, flight attendants reported significantly higher negative emotion requirements during COVID-19 ($M_{\text{pre-pandemic}} = 1.98$; $M_{\text{pandemic}} = 2.26$), which supports Hypothesis 1. Overall, the findings indicate a change in only one specific emotional labor demand: negative emotion requirements, which increased significantly.

4.3 Changes in emotion regulation

Regarding Research Question 4, results showed that flight attendants engaged in more surface acting ($M_{\text{pre-pandemic}} = 2.19$; $M_{\text{pandemic}} = 2.46$) and more deep acting ($M_{\text{pre-pandemic}} = 2.51$; $M_{\text{pandemic}} = 2.73$) during COVID-19 compared to the pre-pandemic period. These findings suggest that flight attendants engaged more in active emotion regulation during COVID-19 than before.

4.4 Changes in relationships between emotional labor requirements and well-being

Next, we examined how the relationships between emotional labor requirements and job satisfaction, as well as emotional exhaustion, differed between the two samples. Hypothesis 2 posited that positive emotion requirements would have a weaker positive or even negative association with job satisfaction (H2a) and a stronger positive association with emotional exhaustion (H2b) during COVID-19. However, contrary to these expectations, our findings revealed no significant differences. In both samples, it was unrelated to job satisfaction and positively associated with emotional exhaustion (see Table 5). However, in support of Hypothesis 3a, the positive relationship between sensitivity requirements and job satisfaction disappeared in the COVID-19 sample ($\beta_{\text{pre-pandemic}} = 0.14$ vs. $\beta_{\text{pandemic}} = 0.01$). The simple slopes depicted in Fig. 2 illustrate that job satisfaction differences were primarily driven by flight attendants reporting low sensitivity requirements, while the slopes converged as subjective sensitivity requirements increased. Contrary to Hypothesis

Table 5 Factor-based simple regression results predicting job satisfaction and emotional exhaustion

| Variable | Pre-pandemic | | Pandemic | | Coefficient comparison | | Test result | |
|----------|-------------------------------|---------|----------|---------|------------------------|-------|-------------|-------------------------------------|
| | β | SE | β | SE | z | p | | |
| | <i>Job satisfaction</i> | | | | | | | |
| H2a | Positive emotion requirements | -0.03 | 0.07 | -0.07 | 0.07 | 0.65 | 0.258 | No difference → no support |
| H3a | Sensitivity requirements | 0.14* | 0.07 | 0.01 | 0.07 | 1.82 | 0.034 | Weaker positive effect → support |
| H4a | Emotion-rule dissonance | -0.38** | 0.06 | -0.43** | 0.06 | 0.93 | 0.176 | No difference → no support |
| H5a | Negative emotion requirements | -0.34** | 0.07 | -0.31** | 0.07 | -0.40 | 0.345 | No difference → no support |
| H6a | Surface acting | -0.56** | 0.06 | -0.45** | 0.06 | -2.39 | 0.008 | Weaker negative effect → no support |
| H7a | Deep acting | 0.04 | 0.07 | -0.08 | 0.07 | 1.68 | 0.046 | Significant difference → support |
| | <i>Emotional exhaustion</i> | | | | | | | |
| H2b | Positive emotion requirements | 0.29** | 0.07 | 0.21** | 0.08 | 1.29 | 0.099 | No difference → no support |
| H3b | Sensitivity requirements | 0.12* | 0.07 | -0.02 | 0.07 | 2.06 | 0.020 | Weaker positive effect → no support |
| H4b | Emotion-rule dissonance | 0.36** | 0.07 | 0.43** | 0.06 | 1.28 | 0.100 | No difference → no support |
| H5b | Negative emotion requirements | 0.20** | 0.07 | 0.37** | 0.07 | 2.74 | 0.003 | Stronger positive effect → support |
| H6b | Surface acting | 0.37** | 0.07 | 0.49** | 0.06 | 2.43 | 0.008 | Stronger positive effect → support |
| H7b | Deep acting | 0.15* | 0.07 | 0.25** | 0.07 | -1.52 | 0.064 | No difference → no support |

Propensity score-matched sample used for regression analysis. Standardized coefficients displayed. $N_{pre-pandemic} = 206$, $N_{pandemic} = 206$

* $p < .05$. ** $p < .01$. (one-tailed)

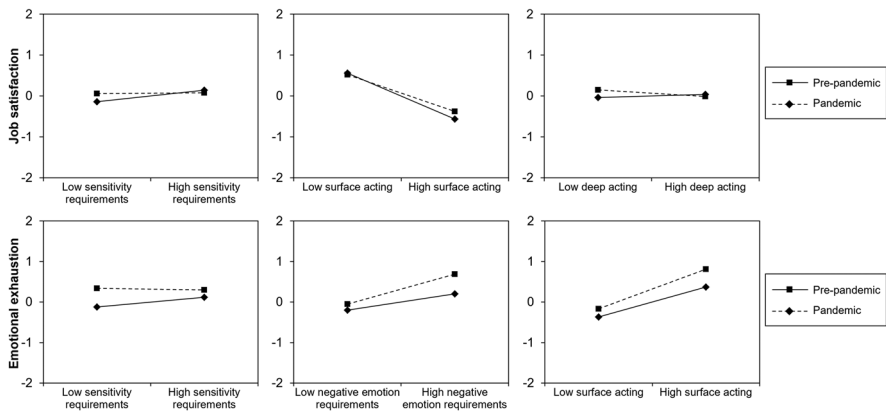


Fig. 2 Simple slopes for the relationships between emotional labor variables and well-being

3b, there was a significantly weaker relationship between sensitivity requirements and exhaustion in the COVID-19 sample ($\beta_{\text{pandemic}} = -0.02$) compared to the pre-COVID-19 sample ($\beta_{\text{pre-pandemic}} = 0.12$). But again, the simple slopes (Fig. 2) converged with increasing sensitivity requirements, with emotional exhaustion being consistently higher on average in COVID-19 times. This suggests that COVID-19 created a strong situational influence (i.e., ceiling effect) on well-being so that the impact of sensitivity requirements may have been overshadowed during COVID-19, becoming more apparent only in the pre-COVID-19 sample.

In Hypothesis 4, we investigated potential changes in the outcomes related to emotion-rule dissonance. Results indicated a consistently strong negative relationship with job satisfaction in both samples ($\beta_{\text{pre-pandemic}} = -0.38$ vs. $\beta_{\text{pandemic}} = -0.43$) and a strong positive relationship of similar size with emotional exhaustion ($\beta_{\text{pre-pandemic}} = 0.36$ vs. $\beta_{\text{pandemic}} = 0.43$). These associations are in line with previous meta-analyses (Hülshager and Schewe 2011) and suggest that the impact of emotion-rule dissonance did not differ significantly between both samples.

Hypothesis 5 addressed the relation of negative emotion requirements to job satisfaction and emotional exhaustion. Negative emotion requirements were consistently associated with lower job satisfaction ($\beta_{\text{pre-pandemic}} = -0.34$ vs. $\beta_{\text{pandemic}} = -0.31$) in both samples. While the negative relationship with job satisfaction remained stable, the positive association with emotional exhaustion significantly increased ($\beta_{\text{pre-pandemic}} = 0.20$ vs. $\beta_{\text{pandemic}} = 0.37$) during COVID-19 (Fig. 2). These findings partially support Hypothesis 5.

4.5 Changes in relationships between emotion regulation and well-being

Regarding Hypothesis 6, analyses revealed consistent negative relationships between surface acting and job satisfaction, as well as positive relationships with emotional exhaustion, in both samples. These findings align with previous meta-analytic results (Hülshager and Schewe 2011). However, contrary to expectations, the negative impact of surface acting on job satisfaction was less pronounced during

COVID-19 ($\beta_{\text{pre-pandemic}} = -0.56$ vs. $\beta_{\text{pandemic}} = -0.45$). Conversely, results indicated a more pronounced relationship with emotional exhaustion ($\beta_{\text{pre-pandemic}} = 0.37$ vs. $\beta_{\text{pandemic}} = 0.49$), which was in line with our expectations. Hypothesis 6 was therefore partially supported by the data (Table 5).

Partially supporting Hypothesis 7, results revealed a significant difference in the relationship between deep acting and job satisfaction across the two groups, with $\beta_{\text{pre-pandemic}} = 0.04$ and $\beta_{\text{pandemic}} = -0.08$. However, neither slope reached statistical significance in either group (Table 5). For emotional exhaustion, deep acting showed a significant positive association before ($\beta_{\text{pre-pandemic}} = 0.15$) and during COVID-19 ($\beta_{\text{pre-pandemic}} = 0.25$), with effect sizes not differing significantly (Table 5). These findings were not entirely in line with our expectations, leading to partial support for Hypothesis 7.

4.6 Exploratory analyses

We conducted exploratory multiple regression analyses to investigate the unique relationships between emotional labor and employee well-being, with results detailed in Table 6 of the Appendix. Analyses yielded consistent findings for negative emotion requirements, as well as for the associations between sensitivity requirements and job satisfaction, and between surface acting and exhaustion (see Table 5 and the Appendix). However, two previously significant associations—between surface acting and job satisfaction, and between sensitivity requirements and exhaustion—became insignificant. Conversely, the expected difference in the effects of emotion-rule dissonance (Hypothesis 4), which initially aligned with predictions but did not reach significance in Table 5, became significant in the multiple regression analyses.

In multiple regression, other predictors act as control variables. As Spector (2021) and Spector et al. (2000) caution, such variables should only be included with strong theoretical justification, as their inclusion may alter the meaning of relationships. This notion becomes especially important considering the requirement to show positive emotions. This demand includes both naturally positive interactions, where expressing positive emotions requires little effort, and situations where positive emotions must be displayed despite not being genuinely felt (Zapf et al. 2021). The latter aligns with the concept of emotion-rule dissonance. By controlling for emotion-rule dissonance in multiple regression, positive emotion requirements primarily reflect instances where positive emotions can be expressed easily. This may explain why multiple regression revealed a clear positive association between positive emotion requirements and job satisfaction.

During COVID-19, this association was significantly stronger. Moreover, regarding emotional exhaustion, the relationship was positive before COVID-19 but turned negative during COVID-19. These findings suggest that during the pandemic, stress-free interactions with passengers—where positive emotions could be displayed without effort—became more salient and may have helped counterbalance other COVID-19-related stressors.

A similar reasoning applies to deep acting as to the requirement to display positive emotions. When controlling for negative situations that are likely when people engage in surface acting, the positive association between deep acting and job satisfaction becomes more pronounced, though it does not differ between the two samples. In contrast, the previously observed link between deep acting and emotional exhaustion disappears in both groups. Additionally, the difference in the relationship between deep acting and job satisfaction across pre-COVID-19 and COVID-19 conditions no longer reaches significance in the multiple regression analysis. Consequently, the effects reported in Table 5 should be interpreted with caution.

In the COVID-19 group, we additionally controlled for job loss insecurity to determine if observed differences were due to increased job loss fears. Although job loss insecurity was negatively related to job satisfaction and positively related to emotional exhaustion, it did not alter the regression coefficients for any of the emotional labor variables. Thus, the identified changes are not merely attributable to heightened job loss insecurity during COVID-19.

To summarize, we can conclude that many, but not all, of our hypotheses were confirmed. The consistent and most important results are that there was a higher requirement to show negative emotions during COVID-19 and that surface acting and deep acting were used more often. With regard to the effects on well-being, there were consistently increased negative effects from the requirement to show negative emotions and from surface acting.

5 Discussion

In light of the changed work environment of flight attendants during COVID-19, the goal of the present study was to examine whether emotional labor requirements, emotion regulation, and their consequences in terms of job satisfaction and emotional exhaustion had changed during this time. At the outset, we acknowledged that COVID-19 introduced factors that could either increase or decrease various aspects of emotional labor, why several open research questions were examined. Regarding emotional labor requirements, our findings revealed noteworthy differences in the prevalence of the requirement to convey negative emotions, whereas no change was observed for positive emotion requirements, sensitivity requirements, and emotion-rule dissonance. However, there were increases in the emotion regulation strategies surface acting and deep acting. Regarding the consequences on employee well-being, we found that about half of relationships remained consistent with pre-pandemic conditions. These results will be discussed in greater detail in the subsequent section.

5.1 Theoretical implications

Our results showed no significant changes in the levels of positive emotion requirements and sensitivity requirements during COVID-19. This indicates that situations requiring sensitivity, empathy, or a friendly demeanor remained fairly consistent

during COVID-19 and continued to occur more frequently than in many other professions (Zapf et al. 1999; Kern et al. 2021). Given that the nature of interactions with passengers did not fundamentally alter during flights, it is unsurprising that these requirements remained rather stable in their levels. Additionally, the impact of positive emotion requirements on job satisfaction and emotional exhaustion did not differ significantly during COVID-19. However, the influence of sensitivity requirements on job satisfaction shifted: while sensitivity requirements were positively associated with job satisfaction before COVID-19, this benefit diminished during COVID-19. Moreover, the positive link between sensitivity requirements and emotional exhaustion was no longer observed. One reason might be the significant strain imposed by COVID-19 itself. Its pervasive impact on exhaustion may have overshadowed the effects of sensitivity requirements, implying that their effect becomes negligible when employees are already experiencing high levels of exhaustion because of COVID-19.

A key finding of our study is the intensified requirement for flight attendants to display negative emotions due to COVID-19. Previous research has explored the use of negative emotions in specific contexts, such as bill collectors (Sutton 1991) and criminal detectives (Stenross and Kleinman 1989). The interesting issue about flight attendants is that there is likely to be a nuanced transition between surface acting—faking positive emotions—and the strategic use of negative emotions. Situations requiring the expression of negative emotions may arise when service providers experience intense negative emotions themselves, such as in response to verbal attacks or insults from customers. Alternatively, they may not experience negative emotions internally but intentionally adopt a negative emotional display to assert authority or emphasize the seriousness of a situation. In these cases, the expression of negative emotions is not a spontaneous reaction but a deliberate, strategic display—comparable to “negative surface acting,” in contrast to the more commonly studied “positive surface acting.” For instance, if passengers do not comply with safety regulations due to negligence, flight attendants might initially engage in positive surface acting. However, if a passenger intentionally disregards safety rules, positive surface acting may prove ineffective, leading to a shift toward negative surface acting to increase the emphasis on compliance with safety regulations. This strategic approach to emotional display is an area that remains underexplored in current research.

Regarding the consequences of negative emotion requirements, our findings align with previous research (e.g., Dormann and Kaiser 2002), revealing negative associations with job satisfaction and positive associations with emotional exhaustion both before and during COVID-19. Notably, the strain associated with negative emotion requirements appeared to increase during COVID-19, as evidenced by a significantly stronger positive relationship with emotional exhaustion. This suggests that situations necessitating the display of negative emotions became more aversive and stressful during COVID-19. The increased frequency of such situations, coupled with their intensified impact on strain, further indicates that emotional labor has become more detrimental to employee well-being in this regard.

One aspect that remained almost stable is the frequency of emotion-rule dissonance, which is considered the primary work stressor driving the adverse effects

of emotional labor on employee well-being (Hülshager and Schewe 2011). A plausible explanation for this stability could be the counterbalancing effects of pandemic-related changes in job demands. Specifically, while the frequency of situations requiring the display of positive emotions that are not genuinely felt may have decreased due to reduced passenger interactions and onboard service (Zahraee et al. 2023), there was a concurrent increase in situations necessitating the expression of unfelt negative emotions, such as enforcing COVID-19-related regulations (e.g., Sinicrope et al. 2021), as mentioned above. These opposing trends may have offset each other, resulting in consistent overall levels and consequences of emotion-rule dissonance before and during COVID-19. This finding underscores the complex interplay of emotional labor in dynamically changing environments. Beyond this explanation, it is important to note that while the negative effects of emotion-rule dissonance on job satisfaction and its positive effects on exhaustion did not differ between the samples in single regressions, they became more pronounced during COVID-19 in multiple regressions, aligning with Hypothesis 4. Future research is needed to further clarify these findings.

Regarding emotion regulation, our findings revealed a significant increase in both surface and deep acting. This finding may be attributed to the challenges posed by wearing face masks, which hindered both emotion recognition and expression (e.g. Carbon 2020; Kastendieck et al. 2022), as well as the difficulty employees encountered in genuinely experiencing the required emotions due to the stress and disruptions brought about by COVID-19 (Kim et al. 2022; Tam and Trang 2024). As a result, there might have been a greater need to engage in emotion regulation in order to compensate for these challenges. Conversely, an alternative perspective suggests that employees might have felt more motivated to engage in emotion regulation due to a renewed sense of enthusiasm upon returning to work after the lockdown (Xiao et al. 2022). This renewed motivation could be driven by a stronger desire to serve customers well (see Trumpold et al. 2021).

Regarding the outcomes of emotion regulation, our findings aligned with some expectations while contradicting others. Consistent with prior research (Hülshager and Schewe 2011; Kammeyer-Mueller et al. 2013; Chung et al. 2021), surface acting exhibited strong positive associations with emotional exhaustion and negative associations with job satisfaction both before and during COVID-19. Additionally, the requirement to wear face masks during COVID-19 seems to have exacerbated the strain associated with surface acting. However, at the same time, it was less negatively associated with job satisfaction. However, interestingly, its negative impact on job satisfaction was less pronounced during COVID-19. This suggests that surface acting, although more demanding, became a more viable coping strategy during the pandemic, as employees faced heightened stress related to COVID-19 itself (Kim et al. 2022), leading to more frequent experiences of negative emotions that required regulation. This is in line with previous research indicating that individuals under chronic stress tend to engage in surface acting more frequently, yet they perceive its impact on their work as less detrimental compared to those experiencing lower stress levels (Trumpold et al. 2024).

The consequences of deep acting have worsened significantly, which was in line with expectations. It appears that the assumed balance between gain and loss of

resources (Liu et al. 2008; Pugh et al. 2011) tilted into an imbalance during COVID-19, thereby changing the effect direction. One reason might be that flight attendants received less feedback from their customers in result to their engagement in emotion regulation. However, this feedback is essential for the restorative side of difficult or stressful customer interactions (Lilius 2012). This explanation further aligns with our post hoc examination of the items measuring deep acting. We observed significantly higher means in the pandemic sample on the two items incorporating the phrases ‘make an effort’ and ‘work hard’, suggesting that deep acting during COVID-19 demanded more resource investment. However, these results should be viewed with some caution, as they did not occur in the multiple regressions. Despite the changes regarding deep acting, it should be noted that surface acting was still the more negative strategy as compared to deep acting.

In summary, our findings deepen our comprehension of how COVID-19 had altered emotional labor in service occupations, specifically within the context of flight attendants. Many, though not all, of our hypotheses were supported. The most consistent and significant findings indicate an increased requirement to express negative emotions during COVID-19, alongside a higher prevalence of both surface and deep acting. Regarding exhaustion, the negative impact of negative emotion requirements and surface acting was consistently stronger during the pandemic. Additionally, multiple regression analyses revealed a similar pattern for emotion-rule dissonance. These findings suggest that the most well-established stressors in emotional labor—negative emotion requirements, emotion-rule dissonance, and surface acting (Hülshager and Schewe 2011; Kammeyer-Mueller et al. 2013; Zapf et al. 2021)—were linked to even greater strain under COVID-19 conditions. Thus, our study contributes to the evolving research on emotional labor during COVID-19 and supports the applicability of COR theory for emotional labor, as evidenced by recent studies (Nesher Shoshan et al. 2023; Winkler et al. 2024).

5.2 Practical implications

Our findings offer three key implications for service organizations, especially airlines. First, given the extensive physical and psychological challenges imposed by COVID-19, it is crucial for airlines to implement targeted initiatives aimed at enhancing employee well-being (see also Hamouche 2023). In line with other research (Blasco-Belled et al. 2024), our results underscore that the pandemic itself significantly contributed to emotional exhaustion among employees. Therefore, interventions that support employees in coping with stress are essential. This need is further emphasized by the fact that many organizations reduced or suspended various training programs during the pandemic, including those focused on mental health support (Dajnoki et al. 2023). Employers must recognize that while crises are temporary, sustaining a healthy and engaged workforce is critical for long-term organizational resilience and recovery.

Second, our study clearly highlighted the evolving impact of emotional labor on flight attendants, emphasizing the need for airlines—and other service organizations—to adapt their support strategies. COVID-19 has amplified the complexity of

flight attendants' roles, requiring them more often to balance the dual responsibilities of being a welcoming host while simultaneously enforcing strict safety protocols. This is reflected by our finding that negative emotion requirements increased and were also more strongly associated with emotional exhaustion. Given that such role conflict is a well-established source of workplace stress (Hülshager and Schewe 2011), it is essential for airlines to provide clear guidance on managing these competing demands. Offering structured support and clarity regarding when and how to prioritize each aspect of their role could mitigate the adverse effects of emotional labor. Research suggests that role clarity can enhance employees' ability to manage emotional labor effectively (Chung et al. 2021), underscoring the importance of targeted organizational interventions. Practical measures could include incorporating discussions on role prioritization into pre-flight briefings led by the purser. These briefings can equip flight attendants with strategies to navigate challenging interactions and reinforce the availability of managerial and peer support when needed (Chung and Jeon 2020). Such initiatives not only support employee well-being but also contribute to maintaining high service standards under challenging conditions.

Third, the increased use of surface and deep acting by flight attendants during COVID-19, coupled with the recognition that surface acting was more straining and deep acting less rewarding during COVID-19, prompts consideration of how to mitigate the negative effects of emotional labor in future scenarios. A key explanation for these findings is the challenge posed by face masks, which limit expressiveness in the mouth-nose region (Carbon 2020; Grundmann et al. 2021). Compensatory actions could include using extra gestures, facial expressions, and refining language, body language, and tone, as suggested by Lafferty et al. (2021). To address the imbalance in effort and reward of deep acting, alternative channels for customer feedback—verbal, written, nonverbal, or feedback terminals—could be explored (Lafferty et al. 2021). Informing passengers about the significance of feedback for the cabin crew and encouraging explicit communication of satisfaction might also prove beneficial. Another effective strategy to combat the pronounced effects could involve offering employees training in emotion regulation (e.g., Pogrebtsova et al. 2022) or, at a minimum, enhancing their emotion recognition skills (e.g., Leitzke et al. 2022). Such training would help employees adapt to the reduced nonverbal cues available when customers wear face masks, improving their ability to navigate emotionally challenging interactions.

5.3 Limitations

A first limitation refers to the generalizability of our study. All participants were flight attendants from Germany and from the same airlines. Although this enabled us to reliably compare emotional labor requirements, regulation strategies, and their relationships with outcome variables, it remains unclear whether these results can be replicated in other service professions. Moreover, we were unable to explore potential cultural differences and their impact on emotional labor. However, it is important to acknowledge that cultural differences in terms of display rules (Mesquita and Delvaux 2013; Zapf et al. 2021) are likely to be significant factors in this context.

Future research is therefore needed to secure central findings and explore their external validity in a more heterogeneous sample of service employees of different professions in general, and across different countries and cultures (see also Kern et al. 2021).

Second, while our comparison involved propensity score-matched samples drawn from the same population, caution is warranted when interpreting our results. Our study lacks an experimental design, precluding causal conclusions (Antonakis et al. 2010). However, given the similarity between the two samples regarding socio-demographic characteristics, occupations, and employers, it seems reasonable to infer that our findings are associated with changes arising from COVID-19, notably alterations in work organization and the implementation of face masks. Furthermore, we believe that any potential selection bias (Heckman 1979) should be comparable across both samples by matching participants based not only on demographic characteristics but also on personality traits. There seems to be no further evident reason for systematic differences in response probability within the COVID-19 sample. Nevertheless, it is important to recognize that confounding factors cannot be fully ruled out.

Finally, it is important to note that our study relied solely on self-report data. To mitigate common-method variance, we adhered to recommended practices (Podsakoff et al. 2012). Anonymity was assured during data collection, and participants were explicitly informed that there were no right or wrong answers, emphasizing the importance of honest responses. Moreover, we employed identical measurement tools and statistical analyses in both samples. This consistency reduces the likelihood that differences between the pre-pandemic and pandemic periods are artifacts of common-method bias.

Appendix

See Table 6.

Table 6 Factor-based multiple regression analysis with and without control of job loss insecurity

| Variable | Pre-pandemic | | Pandemic | | | |
|-------------------------------|-----------------------------|------|----------|------|----------|------|
| | β | SE | β | SE | β | SE |
| <i>Model 1</i> | <i>Job satisfaction</i> | | | | | |
| Positive emotion requirements | 0.16* | 0.09 | 0.50** | 0.09 | 0.50** | 0.09 |
| Sensitivity requirements | 0.16* | 0.07 | - 0.07 | 0.07 | - 0.07 | 0.07 |
| Emotion-rule dissonance | - 0.45** | 0.08 | - 0.65** | 0.08 | - 0.65** | 0.08 |
| Negative emotion requirements | - 0.19** | 0.07 | - 0.28** | 0.06 | - 0.28** | 0.06 |
| Job loss insecurity | | | | | < .01 | 0.06 |
| <i>Model 2</i> | <i>Job satisfaction</i> | | | | | |
| Surface acting | - 0.61** | 0.06 | - 0.54** | 0.07 | - 0.54** | 0.07 |
| Deep acting | 0.21** | 0.06 | 0.19** | 0.07 | 0.19** | 0.07 |
| Job loss insecurity | | | | | 0.03 | 0.06 |
| <i>Model 3</i> | <i>Emotional exhaustion</i> | | | | | |
| Positive emotion requirements | 0.16* | 0.10 | - 0.16* | 0.10 | - 0.17* | 0.10 |
| Sensitivity requirements | - 0.01 | 0.07 | - 0.08 | 0.07 | - 0.07 | 0.07 |
| Emotion-rule dissonance | 0.22** | 0.09 | 0.47** | 0.08 | 0.48** | 0.08 |
| Negative emotion requirements | 0.12* | 0.07 | 0.28** | 0.07 | 0.28** | 0.07 |
| Job loss insecurity | | | | | 0.09 | 0.06 |
| <i>Model 4</i> | <i>Emotional exhaustion</i> | | | | | |
| Surface acting | 0.35** | 0.07 | 0.49** | 0.07 | 0.49** | 0.07 |
| Deep acting | 0.05 | 0.07 | 0.01 | 0.07 | 0.01 | 0.07 |
| Job loss insecurity | | | | | 0.07 | 0.06 |

Propensity score-matched sample used for regression analysis. Standardized coefficients displayed.

$N_{\text{pre-pandemic}} = 206$, $N_{\text{pandemic}} = 206$

* $p < .05$. ** $p < .01$ (one-tailed)

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Data availability The data that support the findings of this study are available from the corresponding author upon request.

Declarations

Conflict of interest The authors declare that they have no conflict of interest in the conduct and reporting of the study and that ethical standards were adhered to throughout the study.

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