Workers Pay the Price:
Effort, Identity, and Emotional Well-Being

Rachel Kranton
Duke University

Duncan Thomas
Duke University

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Abstract

This paper asks whether identity relates to employees' work and emotional well-being, when very high effort may be necessary for their jobs. Using survey data we collected in a single organization during the Covid-19 pandemic, we document high levels of emotional distress among workers and find that this distress varies systematically with how employees identify with their work and the organization. Workers with the largest decline in mental health were more likely to indicate their jobs required more effort than before the pandemic and that the organization does not share their values. Levels of stress and anxiety, in particular, are related to work and identity, with higher levels for employees who are more likely to report that work is important to them. Requiring greater effort, identifying with work, and not sharing the organization values interact to reinforce the associations with worse emotional well-being. These relationships hold across job roles, career stage, and the number of children in households, indicating fundamental associations between employees' emotional well-being, their identities, and their work.

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This paper studies employees' work and emotional well-being when unsually high effort could be needed to do their jobs. The investigation considers how two dimensions of employees' identities – the importance of their work to them and the extent to which they share values with their organization – relate to their emotional well-being. Traditionally, economics has emphasized monetary incentives for workers to provide additional effort. However, a growing literature posits that workers have intrinsic motivations to do their jobs well, and employees who have a sense of shared values and mission with their organization derive direct benefits from their work.[1] This paper leverages a unique opportunity to study the associations of these factors with individual employee effort and emotional well-being.

We conducted an IRB-approved confidential survey of employees of a single organization during the Covid-19 pandemic specifically for this purpose. In this organization, pecuniary rewards were largely constant; workers were guaranteed continued employment, and take-home pay was fixed. The survey asked employees about their work, identity, and emotional well-being. Respondents reported how much they felt they accomplished and how much effort that took, all relative to before the pandemic. They reported the extent to which they agreed with statements that work is important to them and that the organization shares their values. Respondents provided information about their overall mental health, and their stress, anxiety, and depression symptoms. The survey also included household composition, job roles, and basic demographics. Over four thousand employees responded to the survey.

We first document associations between employees' identities and their work, relative to the theory. Theories of intrinsic motivation, in which workers derive direct utility from work and doing their jobs well, predict workers would exert higher effort to do so when necessary (Kreps

[1] See Kreps (1997), Akerlof & Kranton (2000, 2005), Bénabou & Tirole (2003), Besley & Ghatak (2005), Gartenberg, Prat & Serafeim (2019)).

(1997), Akerlof & Kranton (2005), Cassar, & Meier (2018)). We find employees who indicate work is important to their sense-of-self also report exerting significantly higher effort than the no Covid hypothetical and accomplish about the same amount. Employees who are more likely to report that the university does not share their values, however, also report needing significantly higher effort than the no Covid hypothetical, and they report accomplishing less relative to the same hypothetical. This pattern does not support theories that workers exert higher effort when they feel more affinity with their firm (Besley & Ghatak (2005), Akerlof & Kranton (2005) but rather indicates employees are more likely to think an organization does not share their values when the organization's policies lead to more effort needed to accomplish tasks.

Investigating how employee emotional well-being varies with these work and identity variables, we uncover patterns that point to potentially important new areas in the study of organizations and workers. The survey responses indicate the participants experience high levels of mental distress. Almost half of the employees report worse mental health at the time of the survey (during the pandemic) relative to before the pandemic.[2] At the time of the survey, employees also report high levels of stress and anxiety. Answers to a 20-question CES-D clinical screener for depression (Radloff, 1977) indicate over forty percent have significant depressive symptoms. These levels match those in other populations (https://covid19.nih.gov/covid-19-topics/mental-health), despite the low risk of loss of income and employment and some feasibility of remote work, at least in principle, for this population. Our analysis finds that this mental distress is not uniform within the study sample of employees but systematically, and

[2] Using the 2019 National Health Interview Survey (NHIS) sample re-weighted to match the organization's demographics, Thomas et al. (2021) find significantly elevated prevalence and severity of depressive symptoms and anxiety among the respondents to the first wave of the ROUSE survey fielded in October-November, 2020.

robustly, relates to their relationships with the organization and their reported levels of effort needed and accomplishment relative to before the pandemic.

Three main themes emerge. First, the decline in mental health is mostly significantly associated with two variables: (a) more effort needed to accomplish tasks relative to pre-pandemic benchmarks, and (b) less affinity with the organization. The first association points clearly to a shock to work conditions that worsened mental health. The second association has a more ambiguous time dimension as sharing university values is not measured relative to a pre-pandemic benchmark. What is clear, though, is that the respondents who report less affinity with the organization at the time of the survey suffered the largest decline in mental health after the onset of the pandemic. Those who report lower affinity with the organization could have perceived the organization's policies during the pandemic more negatively but it is also possible that they were at elevated risk of declines in mental health. Either way, after the onset of the pandemic, match of values with the organization appears to be associated with better mental health.

Second, of all the emotional well-being measures, stress and anxiety appear to be the most relevant for the work setting. We find that stress and anxiety measures, more than the CES-D, are related, in particular, to same two variables as for the decline in mental health: (a) more effort needed to accomplish tasks relative to pre-pandemic benchmarks, and (b) less affinity with the organization. A standard devivation in the increase in effort needed is associated with a 7.58 percentage point increase in feeling stressed and a 5.21 percentage point increase in feeling anxious. For the university not sharing one's values are 3.73 percentage points for stress and 2.31 for anxiety. Accomplishing less and work is important to the employee are also significantly associated with higher stress and anxiety but at lower overall levels.

Third, these identity and work indicators interact in predicting lower emotional well-being. The association of more effort needed and stress, for example, is higher if the employee cares about their work. We find that, relative to the direct link between more effort needed and stress, the inclusion of interactions increases the association size by almost two-thirds. In particular, the association is accentuated if the respondent also reported accomplishing less relative to the no-Covid hypothetical, if work was important to them, and if they felt the employer did not share their values. We find similar interactions for each of the well-being measures.

The patterns we uncover are robust to controlling for job role, career stage, and presence of children in the respondent's household. To account for possibly different working conditions and responsibilities, we consider separately faculty and non-faculty employees. For both sub-samples, identity and work measures are significant predictors, in the same direction, of each measure of emotional well-being. Magnitudes are different in some cases; for example, faculty report higher anxiety associated with not sharing university values. We also consider subsamples of respondents above and below the age of 48 to account for career stage. While earlier-career respondents have worse emotional well-being than later-career respondents, the associations between emotional well-being and work and identity variables within each sub-sample are essentially the same. Finally, given local day-care and schools were operating remotely which potentially impacted employees' work and well-being, we consider the presence of children in the household. The associations of emotional well-being and work and identity variables are again largely the same. However, we do find respondents with young child in the household report better overall mental health (both pre-pandemic and at the time of the survey) and significantly lower depression symptoms.

This paper contributes to the growing theoretical and empirical literature in economics on work incentives, organizations, and employees' non-pecuniary motivations. Drawing on findings in psychology and sociology, a theoretical literature posits that employees can have intrinsic, rather than extrinsic (monetary), incentives to exert effort on the job (e.g., Kreps (1997), Bénabou & Tirole (2003), Akerlof & Kranton (2005), Prendergast (2008), Cassar & Meier (2018)). People might identify with their workplace, as an "insider" or feel alienated from their workplace as an "outsider," with implications for job satisfaction and incentive pay (Akerlof & Kranton (2005). These patterns may reflect self-selection of workplaces by workers based on their perception of the values or mission of the employer (Besley & Ghatak (2005)).

Empirical studies provide evidence of these sorts of motivations. In lab experiments, workers forgo wages in order to work at a job that has more purpose or "meaning" (Kesternich, Schumacher, Bettina Siflinger, & Schwarz (2021)), match preferences for innovation and sustainability (Non, Rohde, Andries de Grip & Dohmen (2022)), or involve a prosocial mission (Cassar (2019)).[3] In field experiments, non-financial rewards led to higher performance of public health (Ashraf (2012)), and belief in and having a clear sense of the organization's purpose led to better performance (Gartenberg, Prat, and Serafeim (2019)). In a study of the U.S. civil service, Spenkuch, Teso & Xu (2023) find civil servants' performance decreases when personal ideology is less aligned with that of the agency. In contrast to lab or field experiments, this paper is an observational study of one organization in real-time with survey participation of employees with a range of job roles and demographics. We find that stronger work identity boosts the relationship between sharing organizational values and effort and accomplishment.

[3] Some studies indicate that Corporate Social Responsibility (CSR) initiatives, argued as ways to inject meaning into some tasks or motivate socially minded employees, can be ineffective (Briscese, Feltovich & Slonim (2021)) and have perverse results (List & Momeni (2021)) since employees, it is argued, would then have "moral license" to shirk in other dimensions.

This paper advances the literature on employee well-being and employee mental health. Research in economics considers the associations between poor mental health and lower on-the-job productivity, fewer hours worked, and diminished labor-force participation (e.g., Ettner, Frank & Kessler (1997), Chatterji, Alegria & Takeuchi (2011), Beck et. al. (2011), Ringdal & Rootjes (2022).)[4] We find an opposing pattern: higher levels of effort are associated with higher stress, anxiety, and risk of depression. The amplification of this pattern for employees who do not share the values of the organization suggests workplace policies that relate to job effort are important for employee emotional well-being. Research in organizational psychology posits that autonomy, workload, and organizational context are central to employee well-being and performance (e.g., Karasek (1979)). In recent work using large-scale survey data, De Neve and Grant (2025) find employee well-being derives from factors like belonging, autonomy, and purpose.[5] Relative to these efforts, we, first, examine employees in a single organization allowing individual reporting of how they relate to the organization and, second, we elicited information about changes in mental health as well as specific domains of emotional well-being. The results broadly indicate that worker identity and individual attachment to their workplace is important to understanding effort, productivity, and emotional well-being. Intentional measures of well-being, such stress and anxiety, elucidate these relationships.

[4] In experimental studies in India, Angelucci & Bennett (2024) find that pharmacological intervention to treat depression results in reduced earnings, but that the intervention when coupled with livelihood support decreased depressive symptoms. Kaur, Mullainathan, Oh & Schilbach (2021) show, by staggering wage payments, that financial constraints impede concentration and worker productivity. For the broader relationship between individual economic outcomes and mental health. Ridley, Rao, Schilbach & Patel (2020), for example, consider poverty as a cause of anxiety and depression, and vice versa.

[5] Gosnell, List & Metcalfe (2020)'s field experiment with commercial airline captains, interprets job satisfaction as employee "well-being," and the study draws conclusions on the impact of different management practices on the measured performance and this measure.

Finally, this paper contributes to studies of Covid-19 and workers and firms. A prominent theme is effect of work-from-home on short-term and long-term productivity and the impact of Covid-19 on work hours per se (e.g., Freeman and Ganguli (2023), Gibbs, Mengel, and Siemroth (2023), Goda and Soltas (2023)). Sundaram-Stukel et. al. (2024) describes the mental health of those who became unemployed and those who remain employed drawing on two cross-sectional samples in the United States. In contrast, our study focuses on differential manifestations of the pandemic on effort, productivity, and mental health of workers with different attachments to work itself and to their organization. The study thus provides a view on general questions concerning worker motivation, the relationship between employees and the organization they work for, and emotional well-being.

This paper proceeds as follows. Section I describes the data collection, and Section II summarizes main features of the data. Section III analyzes associations between employee emotional well-being and the work and identity variables. Section IV considers the robustness of the patterns to job roles, career stage, and household composition. Section V concludes with a discussion of the findings and avenues for future research.

I. Institutional Background, Data Collection, and Sample Characteristics

The setting for this study represents an unusual opportunity to investigate links between individual-specific employee work motivations and their emotional well-being, using a survey of employees of a single employer, Duke University, a private, non-profit institution in Durham, North Carolina.[6] University policies in response to Covid-19 abruptly changed the way employees worked. However, employees did not face immediate threat of job loss or reduction in

[6] Duke University's Covid-19 policies, as elaborated below, were largely in line with those of peer institutions and those of the surrounding local community.

current wages as in other parts of the economy. Remote operations and other changes to work conditions potentially entailed investment in new skills and workarounds, but, again due to the university policies, there were no immediate monetary rewards or consequences for investing or not in these changes.

To understand the impact of the change for employees and their work, we developed a longitudinal survey Reopen Our University Safely and Effectively (ROUSE), which was approved by the Duke University Institutional Review Board. Launched in October 2020. ROUSE sent emails to each duke.edu email address, excluding students, inviting the recipient to participate in the study.[7] The email invitations were sent from a dedicated ROUSE@duke.edu address and signed by faculty in the ROUSE research team. The invitation emphasized that ROUSE is an independent faculty-run scientific study and that all responses would be confidential. The emails contained individual-specific links to the survey, and participants provided electronic informed consent before beginning the questionnaire.

Our main study sample comprises respondents to the third survey wave, fielded in March-May 2021, which included our questions about work and identity. Specifically, the questionnaire asked about non-pecuniary motivations, work effort and accomplishment over the past year relative to a no-Covid hypothetical, roles at the university, emotional well-being, and demographics. Of the 4,338 people who started this questionnaire, 166 respondents did not answer at least one of the work or identity questions and are thus excluded from the analysis,

[7] The university-wide recruitment by email was approved by the Provost, and the recipients included all full-time and part-time employees at the university's schools and colleges but excludes employees of the Duke University Health System, which is separate from Duke University and provides health care. ROUSE only includes an anonymized identifier for each respondent. The email master list included former employees and students who were working part time for the university; these respondents are not included in this study. The master list is not informative about the number of eligible employees at the time of the survey, so response rates among eligible employees is not knowable. Characteristics of the eligible population were also not provided so it is not possible to evaluate the representativeness of the sample.

yielding our main analytical sample of 4172 respondents. As shown in Appendix Table 1, about 60% work in what we call the "Campus" which includes arts and sciences departments and professional schools other than medical school, where the rest of the respondents worked. About 20% are faculty (12.4% in the Campus and 8% in the medical school) and the rest are research, administrative and support staff. The sample is about 70% female, and the average age is 47.6 years (with a range from 20 to 82). About 80% of respondents say they are white and about 20% identify as Hispanic. The sample is well-educated: about 87% have completed a college degree and 30% have also completed a doctorate.

At the time of the survey, Duke University was still operating under special pandemic provisions. A hiring freeze and pledge of steady employment were in place, as well as suspended employer contributions to retirement accounts.[8] Eighty percent of classes were online and most activities were remote, with the exception of research labs which had largely resumed operations by summer 2020.[9] Similarly, all local public-school systems and most private schools continued to operate remotely through May 2021.[10] The Covid-19 vaccine was becoming available; in January 2021 anyone aged 65 or older was eligible to receive the vaccine, and all adults were eligible by mid-March 2021. Eligible workers could receive the vaccine at the university as well as other locations.[11]

II. Key Measures: Summary Statistics and Distributions

[8] https://coronavirus.duke.edu/2020/04/securing-our-financial-future/, https://coronavirus.duke.edu/2020/03/duke-to-continue-pay-for-employees/)
[9] https://today.duke.edu/2020/05/duke-labs-begin-phased-deliberate-march-toward-reopening, https://medschool.duke.edu/stories/research-labs-reopen-under-new-normal.
[10] https://abc11.com/durham-public-schools-dps-pascal-mubenga/9448346/, https://www.newsobserver.com/news/local/education/article248681960.html, https://abc11.com/wcpss-board-meeting-remote-learning-wake-county-schools-covid-19/9654857/, https://spectrumlocalnews.com/nc/triangle-sandhills/news/2021/03/24/wake-county-public-schools-heading-back-to-the-classroom.
[11] https://coronavirus.duke.edu/2021/03/vaccination-of-remaining-faculty-and-staff/

In this section we describe and provide summaries of our key measures. First, we describe the *identity measures* and the *work measures* and then we describe the *measures of emotional well-being.*

II.A. *Identity Measures* and *Work Measures*

II.A.1. *Identity Measures*: Work is Important, Shared Values with Organization

The ROUSE survey aimed to capture an employee's intrinsic value of their work and individual value match to the workplace. Respondents were asked to rate agreement to the statement "My work is important to me and how I think about myself" using a scale of 1 to 10 where 1 is strongly disagree and 10 is strongly agree. Respondents also were asked to rate agreement to the statement "The university shares my values" on the same scale. We reverse code the responses to this shared-values question so that in later analysis higher responses on these questions correspond, respectively, to the employee agrees more that work is more important to them and the employee agrees more that the university does not share their values.

Table 1 Panel A.1. provides summary statistics of the identity measures on lines 1 and 2; Figure 1 Panels 1 and 2 display distributions. They illustrate a primary feature of our sample; employees indicate a high level of agreement that work is important to them. The mean response is 8.3 (s.d.=1.7), and the modal response is the maximum, "10. Strongly Agree." As shown, in green, in Figure 1 Panel 1, about 93% of respondents agreed affirmatively that work is important to them (scores 6 and above). In contrast, as seen in Figure 1 Panel 2, in yellow, respondents' agreement on university not sharing their values is more diffuse. The mean response is 3.2 (s.d.=2.2) and about 27% of respondents agree to some extent that the university does not share their values (scores 6 and above). Appendix Table 2 reports the demographic predictors of these identity measures and those for the work measures described next.

II.A.2. *Work Measures*: Effort and Accomplishment

The survey asked respondents how much they felt they had accomplished over the past year relative to a no-Covid hypothetical and then asked for an assessment of the effort needed to accomplish that amount relative to the same no-Covid hypothetical. Answers were on a 1-5 Likert scale, corresponding to 1-Much less, 2- Somewhat less, 3 About the same, 4-Somewhat more, 5-Much more. We first discuss effort and then turn to accomplishment. Since a higher number indicates greater effort needed, we reverse code the responses for accomplishment so that a higher number indicates less accomplishment.

Table 1 Panel A.1. provides summary statistics on lines 3 and 4; Figure 1 Panels 3 and 4 display the distributions. For effort, the average score is 3.9 (s.d.=1.0), and the proportion of respondents who selected each option are shown in Figure 1 Panel 3, in blue. The modal response is "Somewhat more" effort, selected by 40% of respondents and another 30% responded that "Much more" effort was needed. Thus, the pandemic was accompanied by an increase in effort needed to do their work for almost three-quarters of the respondents. In contrast, survey respondents report a wider range of relative accomplishment levels. Figure 1 Panel 4 shows that the distribution of responses, in red, is essentially symmetric around "3. About the same" which is both the mode and the average score (s.d.=1.3). About 37% respondents indicated they accomplished more than if the pandemic had not occurred and about 35% reported accomplishing less, indicating that overall employees exerted additional effort relative to no-Covid and achieved about the same amount.

II.A.3. Correlatons between Identity and Work Measures

We turn next to relationships within and between these identity and work measures. To facilitate comparisons, we convert each measure to a z-score so that a unit change is interpreted

as a standard deviation (sd) shift. Table 1 provides unconditional correlations. (Conditional correlations are provided in Appendix Table 3.)

Correlations Within Identity and Within Work Measures: Comparing the two identity measures, we see that despite high overall levels of intrinsic motivation for work, there is some variation among respondents. Respondents for whom work is more important are more likely to have a value match with the university; the correlation with agreeing the university does not share their values is negative, significant, and large in magnitude (-0.28, column 1, row 1). Comparing the two work measures, respondents who report needing more effort to accomplish a task are slightly more likely to accomplish less; although the correlation is small in magnitude (0.07, column 3, row 3), it is statistically significant.

Correlations between Identity and Work Measures: We next examine the correlations between the identity and work measures. Those who report that work is important say significantly more effort was needed (correlation is 0.06, column 1, row 2). While the magnitude is small, this correlation consistent with theoretical arguments that workers who have intrinsic motivations will exert more effort to accomplish tasks if necessary. The university not sharing an employee's values is associated with small but significantly higher levels of effort needed and significantly lower levels of accomplishment with correlations of 0.07 and 0.06, respectively (in column 2). Again, the magnitudes are small, but these relationships are not consistent with theoretical arguments that sharing values of the organization would be associated with higher worker effort. Rather the relationship suggests that employees feel their organization shares their values when their jobs are easier and they accomplish more.

II.B. Employee Emotional Well-Being

II.B.1. *Measures of Employee Emotional Well-Being*

We used four complementary approaches to measure employee emotional well-being, which reflect the conceptual complexity of the construct and the specific context for this study. Our primary measure captures the change in “overall mental health” which is based on two questions. Respondents were asked to rate their overall mental health at the time of the survey using a five-point scale (Excellent, Very Good, Good, Fair, Poor). They were then asked to rate retrospectively on the same scale their "overall mental health" in January 2020, which was just before the pandemic. We report results for the change in mental health as well as prior and current mental health.

Before answering these questions, respondents were asked to complete the 20-item CES-D Scale which is a widely used clinical screen for depression in the general population. The CES-D covers four broad domains: depressed affect, low positive affect, somatic complaints, and inter-personal problems (Radloff, 1977). Each of the 20 questions concerns a symptom experienced during the previous week, for which the respondent answers using a scale ranging from “rarely” (<1 day), “some” (1-2 days), “occasionally” (3-4 days), to “most of the time” (5-7 days). Following the standard CES-D protocol, we score the responses 0, 1, 2 and 3, respectively, and the total CES-D score ranges from 0 to 60. In the general population, a score of at least 16 clinically screens for people at risk of moderate depression, and a score of at least 23 indicates risk of severe depression (Lewinsohn, Seeley, Roberts and Allen, 1997).

The survey then asked respondents about stress and anxiety, two specific markers of emotional well-being.. Respondents reported whether they "felt stressed out" and whether they "felt anxious" during the previous week, using the same “rarely” to “most of the time” scale as the CES-D questions. For assessing their “overall mental health” at the time of the survey, respondents were asked to use a five-point scale (Excellent, Very Good, Good, Fair, Poor).

Respondents were also asked to rate their "overall mental health" retrospectively in January 2020, which was just before the pandemic, with the same scale.[12]

Below, we first report these self-assessements of overall mental health, then the responses concerning stress and anxiety, and finally the CES-D depression screen. Table 1 Panel B.1. provides the summary statistics, translated to a scale of 0 to 100 to aid comparability; Figure 2 provides the distributions. We provide the demographic predictors in Appendix Table 4. We note here that the patterns by sex and age mimic those established in the literature (Blazer et al., 1994; Nolen-Hoeksema and Girgus, 1994; McLean et al., 2011); males and older respondents report significantly better emotional well-being relative to females and younger respondents, respectively. The youngest respondents had by far the worst emotional well-being, a pattern observed in multiple studies of the pandemic (Ettman et al., 2020; Wathelet et al., 2020, Thomas et al., 2021; Gotlib et al., 2023). Medical school faculty had significantly better emotional well-being indicators relative other employees, which is consistent with Emanuel, Harrington, and Pallias (2026) which finds that workers in jobs which are less “remotable” experience less mental heath distress.

Overall Mental Health: Figure 2 displays self-assessed overall mental health pre-pandemic (in Panel 1) and at the time of the survey (in Panel 2) ranging from excellent (on the left) to poor (on the right) so that a higher number indicates worse health, consistent with the measures discussed above. Over two-thirds of respondents reported excellent or very good pre-pandemic mental health. The fraction reporting excellent or very good mental health at the time of the survey is less than 44%, with an overall rightward shift of the sample distribution. Panel 3

[12] We chose to ask a single question about pre-pandemic emotional well-being for two reasons. First, recall bias is mitigated when a question is salient, which is likely to be the case for a single summary question relative to a series of questions about specific symptoms (Sudman, Bradburn and Schwarz, 1996). Second, the burden of 20 CES-D symptoms plus levels of stress and anxiety recalled from the pre-Covid-19 period was likely to result in high rates of exit from the survey.

in Figure 2 displays the distribution of individual-specific changes in mental health from before to during the pandemic; very few people reported improved mental health, over 40% reported no change, and almost 50% reported worse overall mental health.

Stress and Anxiety: As seen in Figure 2 Panel 4, about 32% of employees reported feeling stressed out occasionally in the past week and 15% report feeling stressed out most of the time. Figure 2 Panel 5 shows about 25% of employees reported feeling anxious occasionally and 10% most of the time.

CES-D: Respondents' answers to the CES-D questions indicate high levels of depression symptoms, given population benchmarks (Lewinsohn, Seeley, Roberts and Allen, 1997). As seen in Figure 2 Panel 6, 44% percent of employees report symptoms placing them at risk of mild depression, indicated by the density to the right of the dashed line at 16, and 24% at risk of severe depression, indicated by the density to the right of the dashed line at 23. The average score on the 60 point scale is 15.6 whichtranslates to 26.1 on the scale of 0 to 100.

II.B.2. Emotional Well-being Correlations:

Table 1 Panel B.2. reports the correlations between the measures of emotional well-being. To facilitate comparisons, each measure is scaled to range from 0—no symptoms or highest well-being—to 100—worst symptoms or lowest well-being. All of the measures of well-being at the time the survey are positively correlated. Stress and anxiety are closely linked but not identical measures (ρ=0.70, column 4, row 4). There is a similar the correlation between the CES-D score and self-assessments of overall mental health (ρ=0.71, column 2, row 6). The latter correlation indicates the single question about overall mental health provides an informative signal about the twenty symptoms in the CES-D assessment, but the two are not identical.

The retrospective assessments of pre-pandemic overall mental health are positively correlated with the measures of emotional well-being at the time of the survey, but the

correlations are less than half as high. This pattern indicates that there is both persistence and change in emotional well-being from January 2020 to March-May 2021. The negative correlation between pre-pandemic overall mental health and the change in overall mental health indicates those who were in excellent or very good mental health pre-pandemic tended to experience the greatest decrease.

III. Emotional Well-Being and Work, Accomplishment, and Identity

In this section, we present our main results which show the dominant relationships between employee emotional well-being and the identity and work measures. As above, the emotional well-being measures are scaled from 0 to 100, and the identity and work indicators are specified as z scores. All regression models (reported in Tables 2, 3a, 3b) control for respondent age and an indicator for whether the respondent is male.

III.A. Emotional Well-Being: Associations with Identity and Work Indicators

We first consider the relationship between the identity and work indicators and the change in employee overall mental health, reported in Table 2. The first and second columns show our first key finding: there are significant, positive associations between worsened mental health and (a) more effort needed to accomplish tasks and (b) reporting the university does not share an employee's values. Respectively, a sd increase is associated with 3.88 and 1.98 percentage points increase in worsened mental health. Accomplishing less relative to the no-Covid hypothetical is also associated with worsened mental health which increases by 1.15 percentage points for each sd decrease in amount accomplished.

The model with all four identity and work measures, in the third column of Table 2, shows these associations with worsened mental health are essentially independent of each other. None of the coefficient estimates or inferences are substantially different than in the models of

the previous columns. Column 1 in Figure 3 depicts the contribution of each identity and work measure to the change in mental health, illustrating the large contribution to worse mental health of the need for more effort (in blue), of not sharing university values (in yellow), and of less accomplishment (in red).

Turning to emotional well-being in March-May 2021 (at the time of the survey), Table 3a shows that stress and anxiety are, in particular, related to identity and work. The models use all four identity and work measures. The first three columns complete the analysis for the self-reports of overall mental health, with column 1 repeating the change in mental health (repeated from column 3 of Table 2)column (2) reporting associations with pre-pandemic overall mental health, and column (3) giving the associations with overall mental health at the time of the survey.We see that work being important to one's sense of self and the university sharing one's values are generally protective both before and during the pandemic indicating longer-term associations with overall mental health.

Table 3a columns (4), (5), and (6) provide our second set of main results: stress and anxiety measures, more than the CES-D, are aspects of emotional well-being closely aligned with work. Columns (4) and (5) show higher levels of the identity and work measures are associated with significantly higher stress and with significantly higher anxiety, taken one at a time as well as taken jointly (as shown by the p-value for the joint test for all four indicators at the bottom of the table). As illustrated in the 1. Direct column for Stress and the 1. Direct column for Anxiety in Figure 3, the estimated associations are largest for expending more effort. From Table 3a, sd increase in effort is associated with a 7.58 percentage point increase in feeling stressed and a 5.21 percentage point increase in feeling anxious. The magnitudes of the estimates for university not sharing one's values are 3.73 percentage points for stress and 2.31 for anxiety,

while the estimates accomplishing less are 1.71 and 1.77 respectivelyc. Work is important to the employee is significantly associated with higher stress and anxiety at about the same levels.

The patterns for the CES-D are less elevated than those for stress and anxiety and not related to the employees' report of work being important. Column (6) of Table 3a and the 1. Direct column for CES-D in Figure 3 show effort is the strongest predictor of higher depression risk followed by university not sharing one's values, then accomplishing less.

III.B. Emotional Well-being: Interactions among Work and Identity Indicators

We next consider possible interactions among work and identity indicators and their links with emotional well-being. For example, employees who report needing more effort could be particularly worse off emotionally if they also felt that they had accomplished less. Similarly, those who expend more effort may feel worse if they felt that work was important to them or if they felt the university did not share their values.

We extend the regression models above accordingly, yielding our third set of main results. We find (i) the associations discussed above are essentially identical whether or not interactions are included in the model, and (ii) the interactions are substantial. Table 3b provides the associations, and Figures 3 and 4 illustrate the fully saturated models. The 1.Direct columns in Figure 3, discussed above, shows the respective models without interactions (from Table 3a). The 2.Total columns for each emotional well-being measuredisplay in purple the additional contributions of all the interactions (from Table 3b). Figure 4 provides a visual breakdown these interactions, where the height of each bar is the sum of the direct association for the indicated identity or work indicator plus each of the interactions.

Most of the interactions are individually significant and all but two of the significant interactions are positive, reinforcing of the direct relationships reported in Table 3b Panel A. All the interactions are also jointly statistically significant for each of the measures of emotional

well-being at the time of the survey (as shown by the p-values in the fifth row of the F test statistics at the bottom of the table).

For example, column (1) in Table 3b shows the full model for worse mental health. Panel A shows more effort needed and not sharing university values have the largest direct relationship (3.8 and 1.46 pp respectively). Panel B shows the interaction between these two variables involves a 1.15 pp worsening of overall mental health. The association of worsened mental health with more effort is also higher for respondents who agree more that work is important to them.

For levels of stress and anxiety at the time of the survey, Columns (4) and (5) in Table 3b Panel B showthese levels are elevated if more effort was expended relative to pre-Covid, and this association is reinforced if less was accomplished relative to pre-Covid, if work was more important, or if the university did not share one's values. The estimated direct associations are much larger than each of the interactions but, in combination, the interactions substantially increase the estimated total increase in stress and anxiety. A sd increase in all four work and identity indicators is associated with a 19.4 percentage-point increase in stress and a 14.8 percentage-point increase in anxiety with the interactions contributing between one-quarter and one-third to the overall magnitude. The patterns are substantively similar for both CES-D..

We highlight here Figure 4's illustration of the interactions with effort and with shared values. Panel 3 shows the large direct association of more effort needed (in blue) with each emotional well-being measure, and this association is reinforced the less the respondent accomplishes (in red), the more work is important (in green), and the less shared values (in yellow). We also note here the large size of the association and interactions for stress and anxiety, relative to other emotional well-being meaures. As shown in Panel 2, all measures of emotional well-being are elevated if the university does not share one's values, and these associations are

magnified if the respondent expended more effort. The associations for anxiety and CES-D are also magnified if work is important to the employee.

IV. Robustness: job roles, career stage, and children

This section considers the above patterns taking into account employee job roles, the employees' age cohort as a proxy for career stage, and the presence of young children in employees' households.

Job Role.

Since working conditions and responsibilities are potentially different, we re-estimate the models separately for faculty and for non-faculty employees. The results are reported in Appendix Tables 5 and 6a. Columns (1), (2), and (3) of Appendix Table 5 provide conditional correlations among the work and identity measures for faculy and non-faculty separately, paralleling Appendix Table 3 for the full sample. Appendix Table 6a presents the direct and interacted associations of the identity, work, and emotional well-being measures for faculty and non-faculty separately, paralleling the estimates in Table 3b for the full sample.

The work and identity measures are significantly related to one another for both faculty and non-faculty for every indicator, as shown by the p-values for tests of joint significance shown on the last lines of Appendix Table 5. In some cases, the specific associations are very similar; in other cases, they are not. For example, both faculty and non-faculty who report expending more effort also report they feel the university does not share their values and report work is important to them. (The latter estimate for faculty is statistically significant in the unconditional correlations but not statistically significant in the conditional associations; this may reflect lack of power since the faculty sample size is one-quarter of the size of the non-faculty sample.) The estimated magnitudes for faculty and non-faculty are very similar, except

for the association between work effort and accomplishment: only faculty report feeling they accomplished less for a higher level of effort relative to the pre-Covid hypotheticals.

Appendix Table 6a shows that for both faculty and non-faculty, identity and work measures are significant predictors of each measure of emotional well-being. While the directions of the associations are the same, their magnitudes differ in some cases. None of the differences is statistically significant for change in overall mental health relative to pre-pandemic or for stress (columns 3 in panels A and B, respectively). The largest differences in the associations lie in anxiety which is particularly elevated for faculty (column 3 panel C), apart from amount accomplished. Agreeing that the university does not share their values is also more strongly related to anxiety for faculty than for non-faculty employees, as are CES-D scores.

We conclude that, in general, the patterns uncovered in this paper are not driven only by faculty or by non-faculty employees. However, the associations are not identical across these two sets, which may reflect different roles in the university, the nature of their work, how the university policies affected their work and future career advancement.

This interpretation is reinforced by the differences between faculty who work in units on the Campus and those who work in the medical school. In the conditional associations in panel II of Appendix Table 5 show no differences inthe identity and work indicators for non-faculty. However, Campus faculty relative to medical school faculty are more likely to feel their work is important to them and more likely to report the university does not share their values. It is tempting to interpret these patterns in the context of Covid-19 when many Campus faculty had to do their their research and teaching from home. In contrast, medical school faculty continued with the clinical aspects of their work, and labs in the medical school re-opened earlier than those in the rest of the university. Medical school faculty were also involved in the university response to the pandemic itself, perhaps enhancing their connection to the university mission.

Age - Career Stage.

We turn next to whether the links between emotional well-being and the pandemic, and policies surrounding it, varied with career stage. It is possible that a greater toll was borne by those who were early in their career or those who felt less secure in their position. As a proxy for career stage (which was not asked in detail on the survey), we stratify the sample by age. Appendix Table 6b Panel I shows the direct associations between work and identity measures and emotional well-being for faculty aged less than 48 years and those aged 48 years and older; Panel II displays the associations for non-faculty employees for the same age groups.[13] Differences in the estimates of the identity or work measures for the two age groups that are significant at 5% are denoted by a "+" in the column to the right of the pair of estimates. There is essentially no difference between younger and older respondents for either faculty or non-faculty. None of the differences is large in magnitude and the only pair of estimates that are significantly different is the association between deteriorated overall mental health and lower accomplishment, which is higher for older but not younger non-faculty. With 32 pairs, there should be at least one significant difference by chance. Results for models that include interactions between the identity and work measures are displayed in Appendix Tables 6c and 6d for faculty and non-faculty, respectively. None of our conclusions are amended in those models.

Children in the household.

The Covid-19 pandemic involved local policies regarding children which possibly impacted employees' effort and productivity as well as their emotional well-being. Many child-care facilities were closed, and school-age children attended classes remotely. To investigate, we

[13] The sample is stratified at age 48 years for three reasons. First, it is the sample mean. Second it corresponds closely to the age at which Duke staff employees are eligible for retirement benefits https://hr.duke.edu/benefits/retirement/erp/faq/. Third, it is around the national average age at which faculty are promoted to full professor. (https://www.cupahr.org/resource/2020-aging-of-tenure-track-faculty-in-higher-ed-implications-for-succession-diversity)

extend the Section III models to include children and adults in employees' households.[14] Controlling for the number of children of different ages and the number of adults (above age 19), Appendix Table 7 provides conditional correlations among the identity and work measures, as in Appendix Table 3, and Appendix Table 8 provides associations of identity, work, and emotional well-being measures as in Table 3b.

Overall, we find the general assocations found in Section III between identity, work, and emotional well-being hold regardless of household composition, with a notable finding that the employees with young children in the household had higher levels of emotional well-being.First, more children in the household below the age of 5 and aged 5-14 years are associated with more effort and less accomplished relative to a no-Covid hypothetical (Appendix Table 7 columns 1 and 2). Those for whom work is important co-reside with more adults. However, none of our conclusions regarding the correlations among work and identity indicators are amended; these estimates in Appendix Table 7 are essentially identical to those in Appendix Table 3.

Second, results for emotional well-being measures, reported in Appendix Table 8, show the overall conclusions are the same in these extended models: the relationships between work and identity measures and emotional well-being are not substantively different when children and adult household composition is taken into account. However, CES-D scores are significantly lower for respondents with children aged <5y in the home. Furthermore, children aged 5-14y in the household are associated with better overall respondent mental health (both pre-pandemic and at the time of the survey) and significantly lower CES-D scores. These findings could reflect

[14] Wave 2 of the survey, conducted in January/February 2021, included questions about household members. For the 58% percent of respondents who completed Waves 2 and 3, we count the number of children aged <5 years, 5-14 years and 15-19 years plus the number of household members excluding the respondent aged > 19 years. To maintain a consistent sample, the average number of households members in each age group is assigned to respondents who completed only Wave 3, and each model includes an indicator identifying these respondents. Conclusions are the same when the sample is restricted to those who completed both Waves 2 and 3 of the survey.

the self-selection of respondents with children and/or that children positively affect emotional well-being.

V. Conclusion: Discussion and Directions for Further Research

This paper is an empirical investigation of employees' emotional well-being, their motivations for work, and the extent to which they perceive their values align with those of the organization. Using data from a survey designed to study these relationships, this paper considers workers and their emotional well-being during a challenging period where work required high effort for many.

Although it is not representative of all workers, the sample has three distinct advantages. First, since all respondents work for a single employer, we can investigate individual intrinsic work motiations as well as variation in individual attachments to that organization. We thus avoid difficulties of taking into account selectivity of different individuals working in different organizations.. Second, the respondents answered complex questions about work, effort, what they accomplished and their mental well-being; their responses are consistent in ways indicating substantial attention was paid when answering the questions. Third, although the impact of the pandemic on productivity and thereby possibly future promotion or job prospects may have weighed on their minds, employees of this organization did not face a threat of immediate or near-term job loss or pay cuts.

Overall, we see that survey respondents had worse mental health than before the pandemic and experienced high levels of stress, anxiety, and depression risk. The study considers possible relationships between these patterns of emotional well-being and the aforementioned identity and work variables.

We have three main findings. First, the decline in mental health is significantly associated with reporting more effort needed to accomplish tasks relative to pre-pandemic benchmarks and reporting the university does not share an employee's values. Second, while all the measures of emotional well-being are associated with the identity and work variables, stress and anxiety have the strongest associations. Third, these direct links are only part of the story: there are interactions between the identity and work indicators that further predict lower emotional well-being. For example, respondents who expended higher levels of effort relative to a no-Covid hypothetical reported worse emotional well-being, with levels of stress particularly elevated. This association was accentuated if the respondent also reported accomplishing less relative to the no-Covid hypothetical, if work was important to them, and if they felt the employer did not share their values. Relative to the direct link between effort and stress, the inclusion of these interactions increases the association size by almost two-thirds. The main results are robust to the job role in the organization, age cohort of the respondent, and the presence of children in respodents' households.

These findings which uncover new patterns of employee well-being have implications for theories about workers' incentives and how they relate to the organization they work for. For example, workers who reported accomplishing less also reported even greater stress if their work is important for their sense of self. This pattern is consistent with theories that workers have intrinsic motivations for work and suffer disutility when not able to achieve what they would hope to achieve. The association between more effort needed and worsened mental health is accentuated among employees who agree more that the organization does not share their values. This latter interaction is not consistent with theoretical arguments that employees who share the mission of an organization would have higher utility from exerting more effort to accomplish tasks. The pattern could instead reflect judgment among those who felt their efforts were not

valued by the university and/or the university did not provide support for their work. The difference between medical school faculty, who agree less that the medical school does not share their values, and non-medical school faculty supports this interpretation.

The study points to new lines of inquiry for the theory and empirics of organizations: the emotional well-being of employees and their identification with their organization, work input, and work output. For example, for self-motivated employees, organizational policies that facilitate accomplishment could have particularly high benefits for both the organization and the employee in terms of greater productivity, while also resulting in greater emotional well-being of the employee. That is, there are possibly complementarities between employee's intrinsic motivations and the value and mission match between employees and firms. Future research could delve further into how different domains of emotional well-being, such as stress and anxiety, relate to work effort, productivity, and organizational policies. Such research, which would advance understanding of these complementarities, is likely to lead to new insights of employee motivations and organizational policies.

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Table 1: Summary statistics and correlations

A. Identity and work indicators

A.1 Summary statistics	Mean	Std Dev	Min	Max
1 Work is important to my sense of self (1=not at all, 10=very much)	8.31	1.73	1.00	10.00
2 University does not share my values (1=not at all, 10=very much)	3.19	2.23	1.00	10.00
3 Effort relative to hypothetical of no Covid (1=much less, …. 5=much more)	3.89	0.96	1.00	5.00
4 Accomplished relative to hypothetical of no Covid (1=much less, …. 5=much more)	3.00	1.25	1.00	5.00

A.2 Correlations	Work important to self	Univ not share values	More effort
	1	2	3
2 University not share my values	-0.28*		
3 More effort relative to no-Covid hypothetical	0.06*	0.07*	
4 Accomplished less relative to no-Covid hypothetical	0.00	0.06*	0.07*

B. Emotional well-being measures

B.1 Summary statistics	Mean	Std. Dev.	Min	Max
1 Overall poor mental health pre-pandemic (0-4)	23.93	17.72	0.00	80.00
2 Overall poor mental health at survey (0-4)	42.32	25.32	0.00	100.00
3 Worsened overall mental health (-4 - 4)	18.39	20.70	-60.00	100.00
4 Felt stressed out (0-3)	48.25	31.36	0.00	100.00
5 Felt anxious (0-3)	42.51	31.40	0.00	100.00
6 CES-D score (0-60)	26.06	17.20	0.00	96.67

Note: Numbers in parentheses are ranges of values in survey. All values have been rescaled to lie between 0 and 100 for comparability except worsened overall mental health which is rescaled to -100 to 100.

B.2 Correlations	Overall mental health			Felt	Felt
	Pre-survey	At survey	Worsened	Stressed	Anxious
	1	2	3	4	5
2 Overall poor mental health at survey	0.59*				
3 Worsened overall mental health	-0.14*	0.72*			
4 Felt stressed out	0.22*	0.52*	0.45*		
5 Felt anxious	0.28*	0.54*	0.42*	0.70*	
6 CES-D score	0.33*	0.71*	0.58*	0.64*	0.65*

Note: * indicates correlation is significant at 5%

Table 2. Relationships between identity, work and worsened overall mental health

	Worsened overall mental health		
Covariates	[1]	[2]	[3]
A1. Identity indicators			
Work important to sense of self	0.13		-0.26
	[0.36]		[0.36]
University not share my values	1.98*		1.55*
	[0.36]		[0.36]
A2. Work indicators			
More effort rel no covid		3.88*	3.80*
		[0.35]	[0.35]
Accomplish less rel no covid		1.15*	1.08*
		[0.35]	[0.35]
B: Sex and age			
Male [indicator var]	-1.92*	-1.31	-1.55*
	[0.68]	[0.68]	[0.68]
Age [years]	-0.23*	-0.21*	-0.20*
	[0.03]	[0.03]	[0.03]
Constant	29.93*	28.92*	28.30*
	[1.36]	[1.34]	[1.36]
Sample size	4,172	4,172	4,172
R^2	0.031	0.061	0.068

Dependent variables are all scaled to 100 with higher values indicating worse emotional well-being.

Identity, effort and accomplishment covariates are measured as z scores.

Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%.

Table 3a. Relationships between work, identity and emotional well-being

	Overall mental health	Overall poor mental health		Felt stressed out	Felt anxious	CES-D score
	worsened ([3]-[2])	pre-pandemic (Jan 2020)	at survey (May/May 2021)			
Covariates	[1]	[2]	[3]	[4]	[5]	[6]
A1. Identity indicators						
Work important to sense of self	-0.26	-1.20*	-1.46*	1.83*	1.55*	0.06
	[0.36]	[0.30]	[0.41]	[0.51]	[0.51]	[0.29]
University not share my values	1.55*	1.14*	2.69*	3.73*	2.31*	2.54*
	[0.36]	[0.29]	[0.42]	[0.50]	[0.51]	[0.29]
A2. Work indicators						
More effort rel no covid	3.80*	-0.94*	2.86*	7.58*	5.21*	3.18*
	[0.35]	[0.28]	[0.40]	[0.50]	[0.49]	[0.28]
Accomplish less rel no covid	1.08*	0.02	1.10*	1.71*	1.77*	1.17*
	[0.35]	[0.27]	[0.38]	[0.46]	[0.48]	[0.27]
B. Sex and age						
Male [indicator var]	-1.55*	-2.98*	-4.53*	-5.75*	-5.99*	-3.10*
	[0.68]	[0.58]	[0.83]	[0.99]	[1.01]	[0.54]
Age [years]	-0.20*	-0.32*	-0.52*	-0.60*	-0.60*	-0.24*
	[0.03]	[0.02]	[0.03]	[0.04]	[0.04]	[0.02]
Constant	28.30*	39.91*	68.21*	78.48*	72.63*	38.44*
	[1.36]	[1.17]	[1.52]	[1.84]	[1.90]	[1.05]
Sample size	4,172	4,172	4,172	4,172	4,172	4,172
R^2	0.068	0.071	0.117	0.159	0.112	0.115
F test statistic for joint significance (p value)						
All covariates in A1 and A2	0.000	0.000	0.000	0.000	0.000	0.000

Dependent variables are all scaled to 100 with higher values indicating worse emotional well-being. Identity, effort and accomplishment covariates are measured as z scores.
Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%.

Table 3b. Relationships between work, identity and emotional well-being, including work and identity interactions

Covariates	Overall mental health worsened ([3]-[2]) [1]	Overall poor mental health pre-pandemic (Jan 2020) [2]	Overall poor mental health at survey (Mar/May 2021) [3]	Felt stressed out [4]	Felt anxious [5]	CES-D score [6]
A1. Identity indicators						
Work important to sense of self	-0.28	-1.42*	-1.70*	1.64*	1.22*	-0.15
	[0.36]	[0.31]	[0.42]	[0.50]	[0.51]	[0.29]
University not share my values	1.46*	1.15*	2.61*	3.55*	2.16*	2.46*
	[0.36]	[0.29]	[0.42]	[0.49]	[0.51]	[0.29]
A2. Work indicators						
More effort rel no covid	3.80*	-0.91*	2.89*	7.65*	5.26*	3.18*
	[0.35]	[0.28]	[0.41]	[0.49]	[0.49]	[0.28]
Accomplish less rel no covid	0.96*	-0.09	0.87*	1.27*	1.36*	0.99*
	[0.35]	[0.28]	[0.39]	[0.48]	[0.49]	[0.27]
B. Interactions						
Univ not share values*Work important	0.13	0.55*	0.68	0.73	0.99*	0.62*
	[0.33]	[0.27]	[0.38]	[0.44]	[0.43]	[0.25]
Work important*More eff rel no COVID	0.85*	-0.15	0.70	1.73*	1.13*	0.62*
	[0.36]	[0.32]	[0.41]	[0.50]	[0.48]	[0.29]
Work important*Accomp less rel no COVID	0.55	-0.18	0.37	1.09*	1.01	0.50
	[0.39]	[0.32]	[0.42]	[0.50]	[0.52]	[0.30]
Univ not share values*More eff rel no COVID	1.15*	-0.24	0.91*	1.32*	1.24*	0.72*
	[0.39]	[0.29]	[0.43]	[0.51]	[0.51]	[0.32]
Univ not share values*Accomp less rel no COVID	-0.62	-0.03	-0.65	-1.04*	-0.99*	-0.41
	[0.40]	[0.29]	[0.41]	[0.48]	[0.50]	[0.30]
More eff rel no COVID*Accomp less	0.40	0.39	0.79*	1.47*	1.40*	0.51*
	[0.33]	[0.26]	[0.37]	[0.45]	[0.44]	[0.26]
C. Sex and age						
Male [indicator var]	-1.61*	-3.01*	-4.62*	-5.87*	-6.13*	-3.19*
	[0.68]	[0.58]	[0.83]	[0.99]	[1.01]	[0.54]
Age [years]	-0.19*	-0.31*	-0.51*	-0.59*	-0.58*	-0.23*
	[0.03]	[0.02]	[0.03]	[0.04]	[0.04]	[0.02]
Constant	28.03*	39.90*	67.93*	77.92*	72.14*	38.24*
	[1.35]	[1.17]	[1.52]	[1.84]	[1.90]	[1.05]
Sample size	4,172	4,172	4,172	4,172	4,172	4,172
R^2	0.074	0.073	0.122	0.169	0.12	0.122
F test statistics (p values) for significance of						
1. More effort + interactions	0.000	0.005	0.000	0.000	0.000	0.000
2. Accomplished less + interactions	0.002	0.656	0.003	0.000	0.000	0.000
3. Work is important + interactioms	0.025	0.000	0.000	0.000	0.000	0.012
4. University shares values + interactions	0.000	0.000	0.000	0.000	0.000	0.000
5. All interactions taken together	0.005	0.324	0.013	0.000	0.000	0.001

Dependent variables are all scaled to 100 with higher values indicating worse emotional well-being. Identity, effort and accomplishment covariates are measured as z scores
Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%.

Figure 1. Identity and work measures

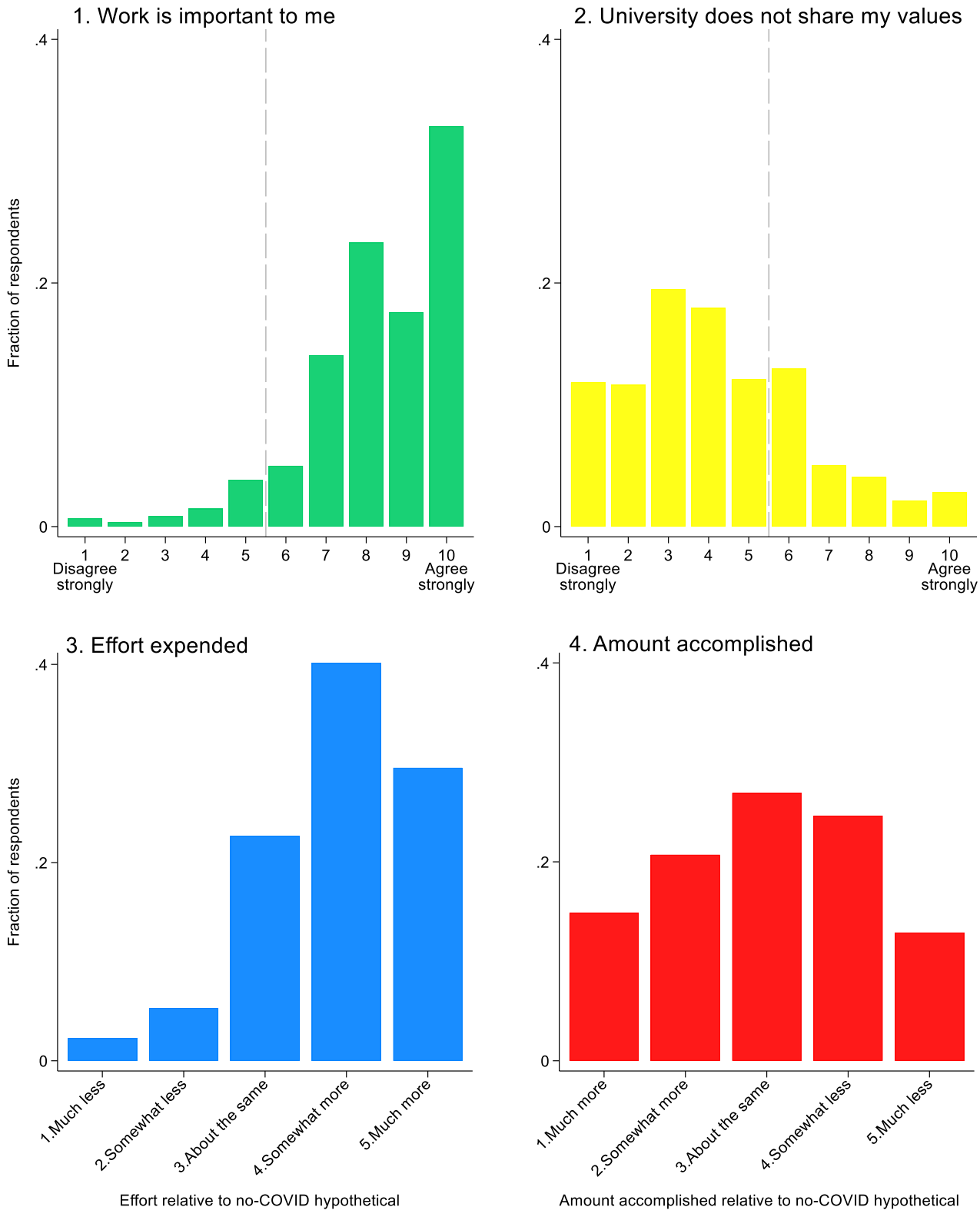
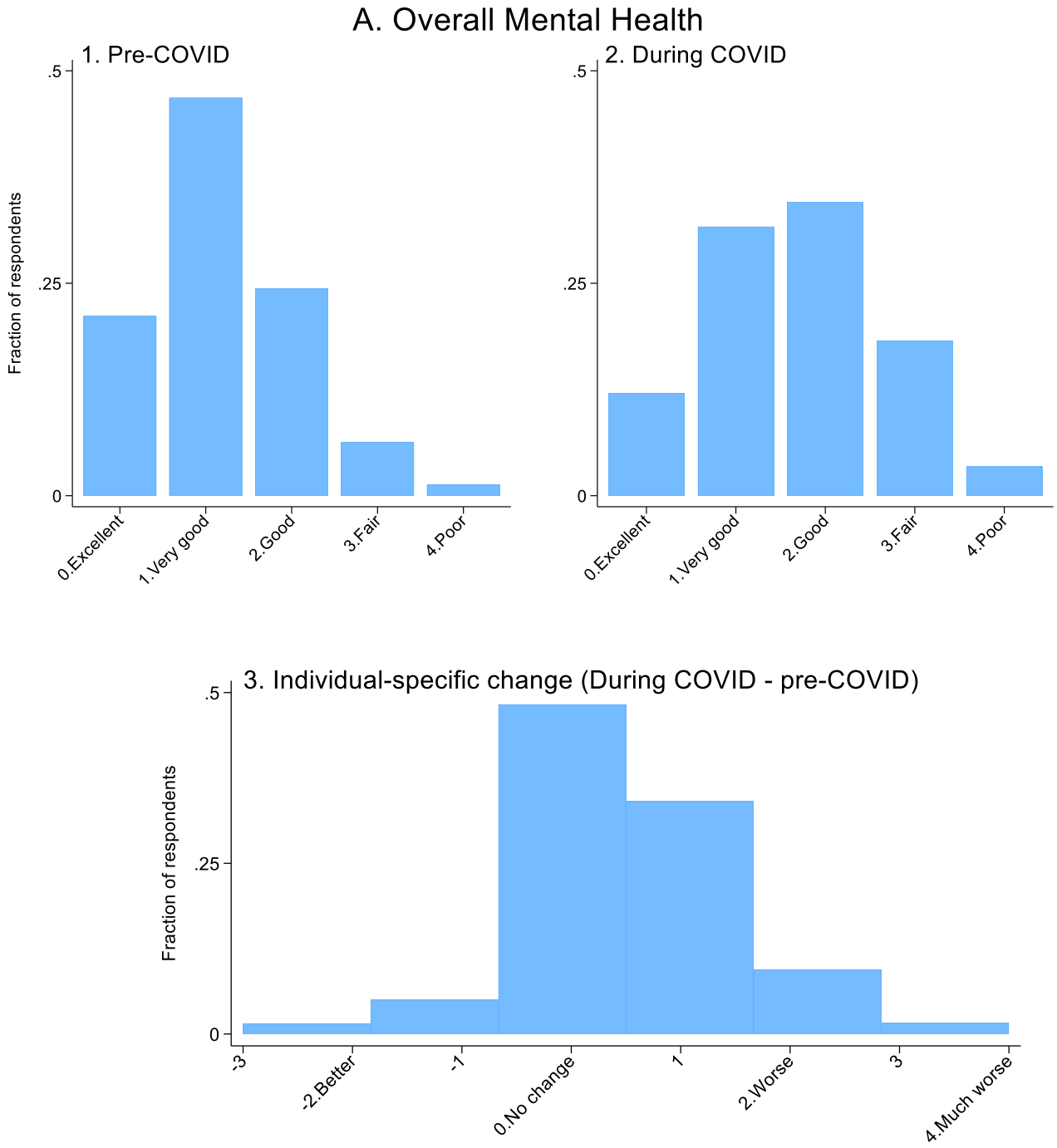


Figure 2. Emotional well-being



Note: Pre-COVID measures refer to Jan 2020. During COVID measures collected in March-May 2021.

Figure 2 (cont.). Emotional well-being

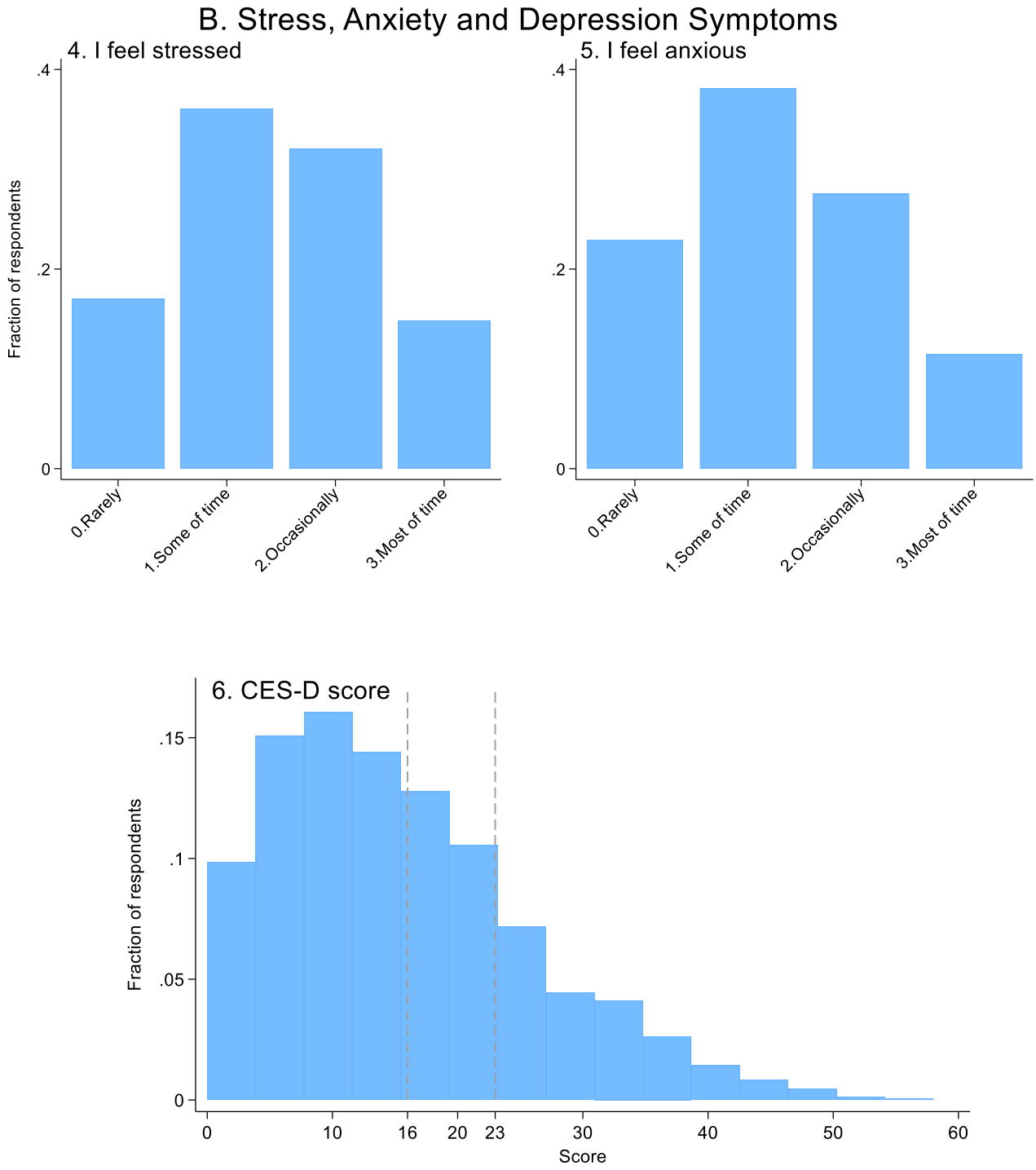
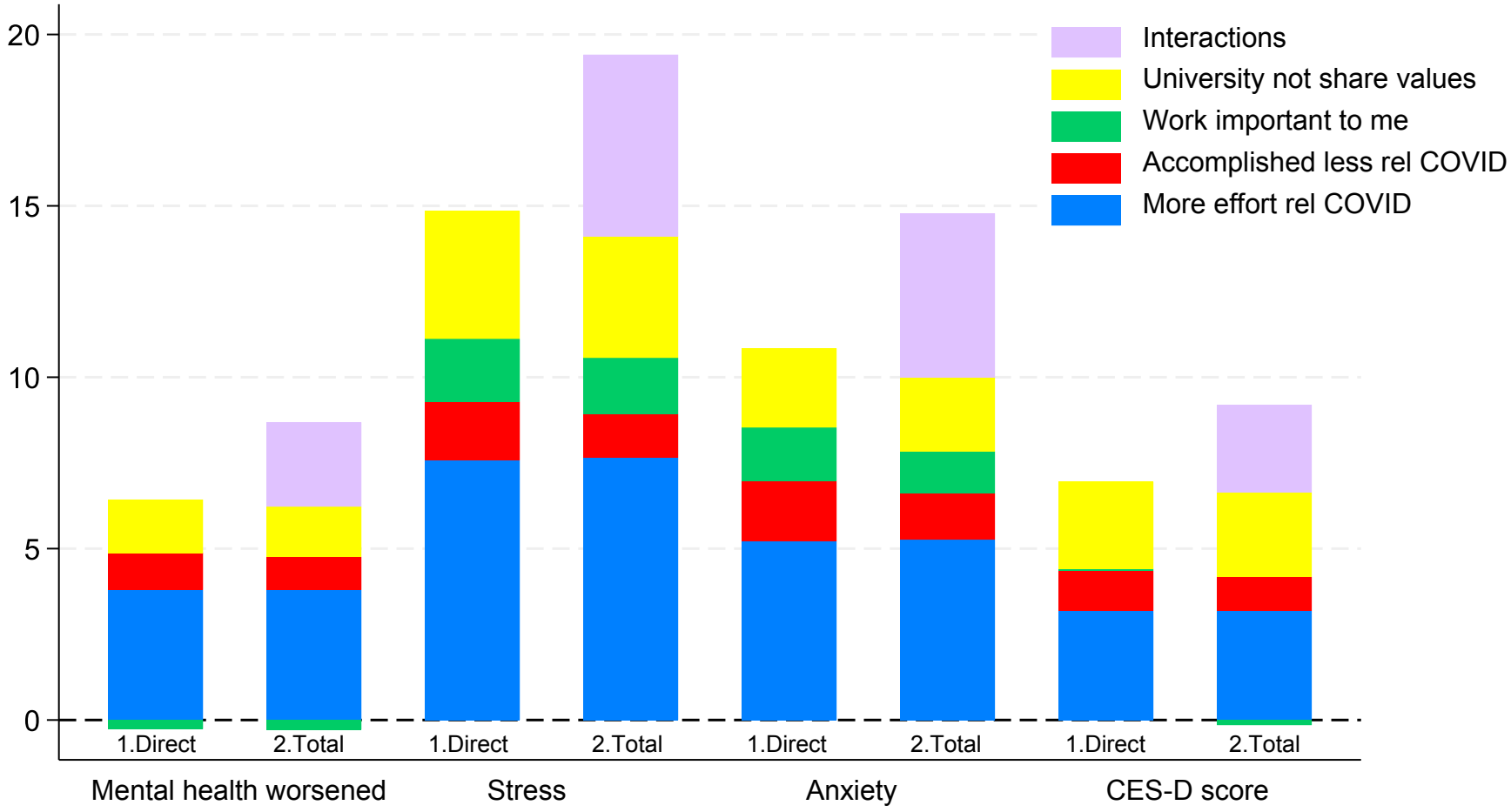


Figure 3. Emotional well-being, work, and identity

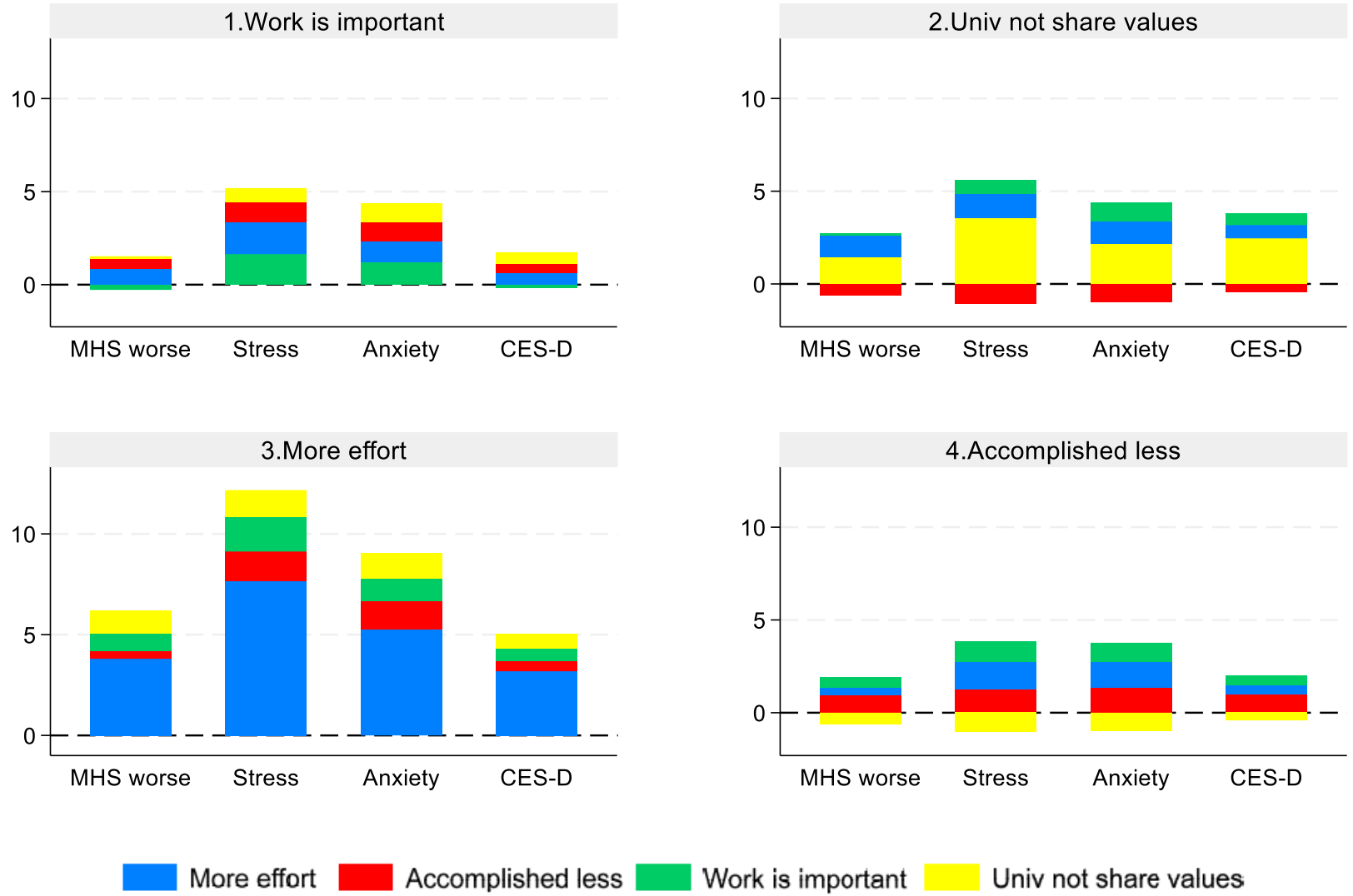
Estimates of direct and total percentage point differences



Note: Heights of bars are percentage point differences from Tables 3a (direct estimates) and 3b (total estimates).

Figure 4. Emotional well-being, work, and identity

Estimates of percentage point differences for each work and identity predictor from regressions with interactions



Note: Heights of bars are percentage point differences.

Appendix Table 1. Characteristics of the study sample

	Mean	Std. dev.
A. University position: % of sample		
Faculty	20.4	40.3
Staff	79.6	40.3
Campus	61.5	48.7
Medical School	38.5	48.7
Campus: Faculty	12.4	32.9
Campus: Non-faculty	49.1	50.0
Medical School: Faculty	8.0	27.1
Medical School: Non-faculty	30.5	46.0
B. Demographic characteristics		
Female (%)	70.3	45.7
Male (%)	29.7	45.7
Age (years)	47.6	12.0
White (%)	79.6	40.3
Black (%)	10.4	30.6
Other race (%)	10.5	30.7
Hispanic (%)	20.7	40.5
Completed college or more (%)	87.5	33.1
Completed doctorate (%)	30.2	45.9
C. Number of household members by age (excl respondent)		
Aged <5y	0.15	0.33
Aged 5-14y	0.36	0.53
Aged 15-19y	0.19	0.37
Aged≥19y	1.11	0.66
Sample size	4,172	

Appendix Table 2. Demographic, job roles and household composition predictors of identity and work indicators

Covariates	Work important to sense of self [1]	University not share my values [2]	More effort rel no covid [3]	Accomplish less rel no covid [4]
Indicator (1) if				
Age <30 years	-0.364*	0.401*	0.272*	0.065
	[0.078]	[0.071]	[0.071]	[0.074]
Age 30-39 years	-0.218*	0.178*	0.216*	0.074
	[0.052]	[0.052]	[0.052]	[0.050]
Age 40-49 years	-0.099*	0.138*	0.246*	-0.058
	[0.049]	[0.052]	[0.048]	[0.048]
Age 50-59 years	-0.049	0.083	0.137*	-0.108*
	[0.045]	[0.049]	[0.046]	[0.044]
(Ref: Age >=60 years)				
Campus faculty	0.263*	0.149*	0.266*	0.268*
	[0.051]	[0.060]	[0.057]	[0.060]
Medical School faculty	0.130*	-0.081	0.151*	0.152*
	[0.059]	[0.069]	[0.067]	[0.069]
Medical School non-faculty	0.033	-0.032	-0.004	-0.092*
	[0.037]	[0.037]	[0.037]	[0.036]
(Ref: Campus non-faculty)				
Completed college but not doctorate	-0.249*	0.07	0.238*	0.033
	[0.050]	[0.053]	[0.049]	[0.046]
Completed doctorate	0.006	0.177*	0.273*	0.198*
	[0.059]	[0.064]	[0.062]	[0.060]
(Ref: Not completed college)				
Male	-0.188*	0.091*	-0.201*	0.055
	[0.034]	[0.035]	[0.035]	[0.034]
(Ref: Female)				
Black	-0.077	0.105*	-0.075	-0.169*
	[0.058]	[0.052]	[0.053]	[0.052]
Not Black or White	0.206*	-0.002	-0.140*	-0.093
	[0.043]	[0.052]	[0.054]	[0.051]
Hispanic	0.064	-0.066	0.022	-0.036
	[0.040]	[0.040]	[0.041]	[0.041]
(Ref: White)				
Household composition				
# HH members aged <5y	-0.035	0.084	0.047	0.064
	[0.049]	[0.049]	[0.051]	[0.048]
# HH members aged 5-14y	0.003	-0.02	0.104*	0.054
	[0.030]	[0.030]	[0.030]	[0.031]
# HH members aged 15-19y	0.013	0.005	0.054	0.015
	[0.042]	[0.045]	[0.037]	[0.041]
# HH members aged >=20y	0.031	0.01	-0.006	-0.009
	[0.021]	[0.023]	[0.026]	[0.024]
(1) if completed HH roster	0.003	-0.028	0.016	0.032
	[0.034]	[0.035]	[0.034]	[0.034]
Constant	0.193*	-0.245*	-0.409*	-0.092
	[0.066]	[0.069]	[0.065]	[0.062]
Sample size	4,172	4,172	4,172	4,172
R2	0.06	0.02	0.04	0.04
F test statistics				
1. F(joint significance all covariates)	15.39	4.96	11.41	10.96
p value	0.00	0.00	0.00	0.00
2. F(HH composition covars sig)	0.70	0.91	3.66	1.31
p value	0.59	0.46	0.01	0.26

All dependent variables are measured as z scores. Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%.

Appendix Table 3. Conditional relationships among identity and work indicators

	Work is importtant to my sense of self	University does not share my values	Relative to hypothetical of no Covid		University does not share my values
			More effort	Accomplished less	
	[1]	[2]	[3]	[4]	[5]
Work is important to my sense of self		-0.289*	0.087*	0.012	-0.283*
		[0.016]	[0.017]	[0.016]	[0.016]
University not share my values	-0.290*		0.093*	0.059*	
	[0.018]		[0.016]	[0.017]	
More effort rel to hypothetical of no Covid	0.081*	0.086*		0.065*	0.084*
	[0.016]	[0.015]		[0.018]	[0.015]
Accomplish less rel to hypothetical of no Covid	0.011	0.054*	0.064*		0.052*
	[0.015]	[0.015]	[0.018]		[0.015]
Work is important*More eff rel no COVID					0.031*
					[0.016]
Work important*Accomp less rel no COVID					0.050*
					[0.016]
Sample size	4,172	4,172	4,172	4,172	4,172
R^2	0.09	0.09	0.02	0.01	0.10
F(joint significance all covariates)	94.87	123.30	21.58	9.24	77.10
[p value]	0.000	0.000	0.000	0.000	0.000

All indicators are measured as z scores. Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%.

Appendix Table 4. Demographic, job role and household composition predictors of emotional well-being

Covariates	Worsened overall mental health ([3]-[2]) [1]	Overall poor mental health pre-pandemic [2]	Overall poor mental health at survey [3]	Felt stressed out [4]	Felt anxious [5]	CES-D score [6]
Indicator (1) if						
Age <30 years	7.72*	13.25*	20.98*	23.92*	22.12*	11.13*
	[1.60]	[1.39]	[1.75]	[2.12]	[2.22]	[1.27]
Age 30-39 years	7.76*	9.99*	17.75*	20.19*	18.40*	9.00*
	[1.03]	[0.89]	[1.26]	[1.56]	[1.58]	[0.86]
Age 40-49 years	6.04*	6.92*	12.96*	14.75*	12.22*	6.40*
	[0.98]	[0.84]	[1.22]	[1.55]	[1.54]	[0.84]
Age 50-59 years	3.36*	3.80*	7.15*	8.00*	5.85*	3.73*
	[0.89]	[0.77]	[1.15]	[1.43]	[1.42]	[0.77]
(Ref: Age >=60 years)						
Campus faculty	-0.01	-2.62*	-2.63	2.56	-0.05	0.69
	[1.21]	[1.03]	[1.48]	[1.78]	[1.79]	[0.99]
Medical School faculty	-3.11*	-4.08*	-7.19*	1.67	-4.74*	-3.84*
	[1.40]	[1.14]	[1.69]	[2.10]	[2.11]	[1.13]
Medical School non-faculty	-0.77	-1.48*	-2.25*	-1.68	-1.71	-1.70*
	[0.76]	[0.65]	[0.89]	[1.12]	[1.11]	[0.62]
(Ref: Campus non-faculty)						
Completed college but not doctorate	1.88	-0.58	1.3	6.09*	7.06*	2.08*
	[1.01]	[0.85]	[1.20]	[1.50]	[1.51]	[0.85]
Completed doctorate	-0.41	-1.39	-1.8	7.80*	7.43*	1.39
	[1.27]	[1.08]	[1.52]	[1.87]	[1.89]	[1.05]
(Ref: Not completed college)						
Male	-1.54*	-2.13*	-3.67*	-8.10*	-7.27*	-3.25*
	[0.71]	[0.59]	[0.86]	[1.05]	[1.05]	[0.57]
(Ref: Female)						
Black	-2.19*	-1.75*	-3.94*	-9.55*	-6.82*	-2.81*
	[1.03]	[0.87]	[1.20]	[1.53]	[1.57]	[0.86]
Not Black or White	-0.28	-1.6	-1.88	-5.16*	-3.89*	-0.8
	[1.11]	[0.91]	[1.25]	[1.58]	[1.62]	[0.85]
(Ref: White)						
Hispanic	0.19	-0.35	-0.16	1.39	0.55	-0.46
	[0.87]	[0.73]	[1.00]	[1.24]	[1.26]	[0.69]
(Ref: Not hispanic)						
Household composition						
# HH members aged <5y	0.97	-0.79	0.18	1.110	-0.17	-1.76*
	[1.00]	[0.82]	[1.14]	[1.54]	[1.54]	[0.85]
# HH members aged 5-14y	0.17	-1.40*	-1.22	0.38	0.18	-0.87
	[0.64]	[0.51]	[0.77]	[0.98]	[0.94]	[0.51]
# HH members aged 15-19y	0.21	0.09	0.3	0.02	-1.22	-0.47

	[0.91]	[0.76]	[1.02]	[1.30]	[1.26]	[0.68]
# HH members aged >=20y	0.61	-1.10*	-0.49	0.38	-0.79	-0.73
	[0.52]	[0.41]	[0.57]	[0.71]	[0.72]	[0.45]
(1) if completed HH roster	-0.65	-0.06	-0.7	0.6	0.36	-0.4
	[0.73]	[0.61]	[0.86]	[1.06]	[1.06]	[0.59]
Constant	13.34*	22.80*	36.14*	33.02*	30.90*	22.94*
	[1.36]	[1.12]	[1.60]	[2.00]	[2.02]	[1.12]
Sample size	4,172	4,172	4,172	4,172	4,172	4,172
R2	0.03	0.07	0.09	0.09	0.08	0.06
F test statistics						
1. F(joint significance all covariates)	7.37	15.83	24.87	24.68	20.72	14.64
p value	0.00	0.00	0.00	0.00	0.00	0.00
2. F(HH composition covars sig)	0.65	3.98	0.82	0.26	0.57	2.63
p value	0.63	0.00	0.51	0.90	0.68	0.03

All dependent variables are measured on a scale of 0-100, with 100 being the worst state. Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%.

Appendix Table 5. Relationships among work and identity-related indicators stratified by faculty and non-faculty

I. Correlations

	Faculty			Non-faculty		
	Work is import-ant	Univer-sity not share values	More effort than pre-Covid	Work is import-ant	Univer-sity not share values	More effort than pre-Covid
University not share my values	-0.24*			-0.31*		
More effort rel to hypothetical of no Covid	0.03	0.08*		0.05*	0.06*	
Accomplish less rel to hypothetical of no Covid	-0.02	0.06	0.22*	-0.03	0.05*	0.02

Note: * indicates correlation is significant at 5%

II. Conditional associations

	1. Work is important to my sense of self			2. University not share my values			3. More effort rel to hypothetical of no Covid			4. Accomplish less rel to hypothetical of no Covid			5. University not share my values		
	Faculty [1]	Non-fac [2]	Diff [3]	Faculty [1]	Non-fac [2]	Diff [3]	Faculty [1]	Non-fac [2]	Diff [3]	Faculty [1]	Non-fac [2]	Diff [3]	Faculty [1]	Non-fac [2]	Diff [3]
Work is important to my sense of self				-0.32* [0.04]	-0.30* [0.02]	-0.02 [0.05]	0.07 [0.04]	0.08* [0.02]	-0.01 [0.05]	-0.03 [0.05]	-0.01 [0.02]	-0.02 [0.05]	-0.34* [0.04]	-0.29* [0.02]	-0.05 [0.05]
University not share my values	-0.20* [0.03]	-0.32* [0.02]	0.13* [0.03]				0.08* [0.03]	0.09* [0.02]	-0.01 [0.04]	0.04 [0.04]	0.04* [0.02]	-0.01 [0.04]			
More effort rel to hypothetical of no Covid	0.05 [0.03]	0.07* [0.02]	-0.03 [0.03]	0.08* [0.04]	0.08* [0.02]	0.00 [0.04]				0.23* [0.04]	0.01 [0.02]	0.21* [0.04]	0.06 [0.04]	0.08* [0.02]	-0.02 [0.04]
Accomplish less rel to hypothetical of no Covid	-0.02 [0.03]	-0.01 [0.02]	-0.01 [0.03]	0.04 [0.03]	0.04* [0.02]	-0.01 [0.04]	0.20* [0.04]	0.02 [0.02]	0.18* [0.04]				0.02 [0.04]	0.04* [0.02]	-0.02 [0.04]
Work important to me* More eff rel no COVID													0.08* [0.04]	0.03 [0.02]	0.06 [0.04]
Work important to me* Accomplished less rel no COVID													0.05 [0.04]	0.05* [0.02]	0.00 [0.05]
[1] if Medical School	-0.18* [0.05]	0.03 [0.03]	-0.22* [0.06]	-0.24* [0.07]	-0.01 [0.03]	-0.24* [0.07]	-0.03 [0.07]	0.02 [0.04]	-0.05 [0.07]	-0.05 [0.07]	-0.07 [0.04]	0.02 [0.08]	-0.25* [0.07]	-0.01 [0.03]	-0.24* [0.07]
Sample size	850	3,322	4,172	850	3,322	4,172	850	3,322	4,172	850	3,322	4,172	850	3,322	4,172
R^2	0.07	0.10	0.12	0.08	0.10	0.10	0.06	0.01	0.03	0.05	0.00	0.04	0.09	0.11	0.11
F(joint significance all covariates)	14.38	64.95	47.21	17.06	82.18	45.71	10.69	7.82	15.65	9.26	3.01	16.40	14.06	56.32	33.67
[p value]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.64

Identity, effort and accomplishment covariates are measured as z scores. Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%.

Appendix Table 6a. Relationships between emotional well-being and work and identity, and interactions among them, conditional on demographics and job rol

Covariates	A. Change in mental health During-pre pandemic			B. Felt stressed out			C. Felt anxious			D. CES-D score		
	Faculty [1]	Non-faculty [2]	Diff [3]	Faculty [1]	Non-faculty [2]	Diff [3]	Faculty [1]	Non-faculty [2]	Diff [3]	Faculty [1]	Non-faculty [2]	Diff [3]
A1. Identity indicators												
Work important to sense of self	-0.84	0.15	-0.99	2.37	1.63*	0.74	5.70*	0.81	4.89*	1.2	-0.1	1.3
	[0.93]	[0.40]	[1.01]	[1.41]	[0.55]	[1.51]	[1.43]	[0.56]	[1.53]	[0.75]	[0.32]	[0.81]
University not share my values	2.77*	1.22*	1.55	5.25*	3.04*	2.21	5.11*	1.47*	3.65*	4.49*	1.97*	2.52*
	[0.82]	[0.40]	[0.91]	[1.13]	[0.56]	[1.26]	[1.16]	[0.58]	[1.29]	[0.70]	[0.32]	[0.77]
A2. Work indicators												
More effort rel no covid	4.36*	3.92*	0.44	9.03*	7.47*	1.56	6.83*	5.21*	1.62	3.58*	3.27*	0.32
	[0.81]	[0.40]	[0.90]	[1.17]	[0.56]	[1.30]	[1.10]	[0.55]	[1.22]	[0.56]	[0.32]	[0.65]
Accomplish less rel no covid	0.59	1.42*	-0.83	0.97	1.34*	-0.37	0.7	1.81*	-1.11	1.09	1.23*	-0.14
	[0.81]	[0.40]	[0.90]	[1.14]	[0.54]	[1.26]	[1.11]	[0.56]	[1.24]	[0.59]	[0.31]	[0.67]
B. Interactions												
Work important*	-0.62	0.12	-0.75	0.3	0.67	-0.37	-0.15	0.98*	-1.13	-0.23	0.60*	-0.83
University not share values	[0.93]	[0.36]	[0.99]	[1.21]	[0.47]	[1.29]	[1.22]	[0.46]	[1.30]	[0.71]	[0.27]	[0.76]
More eff rel no COVID*	-0.07	0.65	-0.71	0.88	1.59*	-0.71	-0.1	1.83*	-1.94	-0.21	0.77*	-0.99
Accomplished less	[0.72]	[0.37]	[0.80]	[0.96]	[0.50]	[1.08]	[0.97]	[0.50]	[1.08]	[0.57]	[0.30]	[0.64]
More eff rel no COVID*	1.39	0.85*	0.54	0.76	1.85*	-1.09	1.07	0.91	0.16	1.11	0.54	0.58
Work is important	[1.08]	[0.40]	[1.14]	[1.55]	[0.53]	[1.63]	[1.38]	[0.52]	[1.47]	[0.84]	[0.32]	[0.89]
More eff rel no COVID*	1.38	1.02*	0.36	0.25	1.40*	-1.15	1.46	0.92	0.54	0.49	0.62	-0.12
University not share values	[0.86]	[0.44]	[0.96]	[1.09]	[0.58]	[1.23]	[1.14]	[0.58]	[1.27]	[0.81]	[0.35]	[0.88]
Accomp less rel no COVID*	-0.88	0.93*	-1.81	-0.97	1.45*	-2.42	-0.16	1.05	-1.21	-0.83	0.65	-1.49
Work is important	[1.13]	[0.44]	[1.20]	[1.38]	[0.55]	[1.48]	[1.29]	[0.58]	[1.41]	[0.82]	[0.34]	[0.89]
Accomp less rel no COVID*	-0.28	-0.84	0.57	-0.07	-1.39*	1.32	-0.43	-1.42*	0.99	0.21	-0.82*	1.02
University not share values	[0.88]	[0.46]	[0.99]	[1.04]	[0.56]	[1.17]	[1.05]	[0.58]	[1.20]	[0.76]	[0.34]	[0.83]
C.												
Male [indicator var]	-0.31	-1.27	0.96	-6.01*	-6.46*	0.45	-5.31*	-6.16*	0.86	-3.60*	-2.84*	-0.76
	[1.42]	[0.80]	[1.62]	[2.03]	[1.17]	[2.34]	[2.07]	[1.19]	[2.38]	[1.12]	[0.64]	[1.28]
Age [years]	-0.20*	-0.18*	-0.03	-0.46*	-0.62*	0.17	-0.45*	-0.60*	0.15	-0.14*	-0.25*	0.11*
	[0.05]	[0.03]	[0.06]	[0.09]	[0.04]	[0.10]	[0.09]	[0.04]	[0.10]	[0.05]	[0.02]	[0.05]
Med School	-2.42	-0.87	-1.56	2.39	-1.45	3.84	-1.49	-1.57	0.07	-2.77*	-1.63*	-1.14
	[1.35]	[0.72]	[1.53]	[2.04]	[1.04]	[2.28]	[2.10]	[1.06]	[2.34]	[1.09]	[0.58]	[1.23]
Constant	26.05*	28.26*	28.26*	71.35*	80.05*	80.05*	62.06*	74.28*	74.28*	32.01*	40.00*	40.00*
	[2.87]	[1.61]	[1.61]	[4.66]	[2.14]	[2.14]	[4.86]	[2.23]	[2.23]	[2.55]	[1.23]	[1.23]
Sample size	850	3,322	4,172	850	3,322	4,172	850	3,322	4,172	850	3,322	4,172
R^2	0.115	0.073	0.084	0.193	0.167	0.173	0.157	0.119	0.128	0.19	0.12	0.135
p(value all Identity covars)	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Dependent variables are all scaled to 100 with higher values indicating worse emotional well-being. Identity and work covariates are measured as z scores
Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%

Appendix Table 6b. Relationships between emotional well-being and work and identity, and interactions among them by age and job role
Stratified by age : less than 48y old and at least 48y at survey

Covariates	A. Change in mental health During-pre pandemic		B. Felt stressed out		C. Felt anxious		D. CES-D score	
	<48y [1]	≥48y [2]	<48y [1]	≥48y [2]	<48y [1]	≥48y [2]	<48y [1]	≥48y [2]
I. Faculty								
A1. Identity indicators								
Work important to sense of self	0.22	-1.82	1.42	2.91	4.64*	7.10*	0.71	1.70
	[1.41]	[1.12]	[1.83]	[1.77]	[2.06]	[1.66]	[1.08]	[0.88]
University not share my values	3.80*	2.45*	4.18*	5.93*	3.72*	6.36*	4.69*	4.88*
	[1.26]	[0.88]	[1.66]	[1.31]	[1.77]	[1.28]	[1.06]	[0.74]
A2. Work indicators								
More effort rel no covid	5.73*	4.06*	9.33*	8.91*	8.75*	6.36*	4.93*	3.22*
	[1.36]	[0.95]	[1.63]	[1.49]	[1.74]	[1.43]	[0.96]	[0.79]
Accomplish less rel no covid	-1.16	1.66	-0.64	2.84	-1.29	2.47	0.15	1.82*
	[1.13]	[1.04]	[1.35]	[1.47]	[1.50]	[1.44]	[0.87]	[0.81]
B. Controls								
Male [indicator var]	1.99	-2.25	-3.74	-8.15*	-2.79	-7.42*	1.00	-6.86*
	[2.38]	[1.70]	[3.02]	[2.70]	[3.35]	[2.61]	[1.88]	[1.37]
Age [years]	-0.03	-0.19*	-0.13	-0.58*	-0.46	-0.51*	-0.10	-0.22*
	[0.21]	[0.09]	[0.28]	[0.17]	[0.31]	[0.16]	[0.16]	[0.08]
Constant	17.42*	25.27*	59.75*	79.66*	61.44*	65.42*	27.11*	37.73*
	[8.11]	[5.61]	[10.93]	[10.15]	[12.05]	[9.28]	[6.33]	[4.77]
Sample size	362	488	362	488	362	488	362	488
R^2	0.10	0.10	0.13	0.19	0.10	0.16	0.15	0.22
II. Non-faculty								
A1. Identity indicators								
Work important to sense of self	0.28	-0.29	2.32*	0.68	1.38	0.6	0.27	-0.34
	[0.54]	[0.57]	[0.76]	[0.84]	[0.77]	[0.79]	[0.43]	[0.47]
University not share my values	1.46*	1.26*	3.11*	3.34*	1.36	1.81*	2.24*	1.87*
	[0.62]	[0.53]	[0.82]	[0.80]	[0.87]	[0.79]	[0.48]	[0.44]
A2. Work indicators								
More effort rel no covid	3.92*	3.69*	6.74*	7.52*	5.16*	4.71*	3.11*	3.22*
	[0.57]	[0.54]	[0.79]	[0.80]	[0.78]	[0.77]	[0.45]	[0.44]
Accomplish less rel no covid	0.78	2.62* +	2.07*	1.09	2.10*	2.07*	1.27*	1.61*
	[0.55]	[0.56]	[0.70]	[0.81]	[0.74]	[0.81]	[0.42]	[0.45]
B. Controls								
Male [indicator var]	2.14	-4.63*	-5.23*	-7.14*	-5.75*	-6.18*	-0.81	-4.48*
	[1.22]	[1.02]	[1.66]	[1.67]	[1.69]	[1.68]	[0.94]	[0.85]
Age [years]	-0.07	-0.28*	-0.50*	-0.53*	-0.61*	-0.42*	-0.22*	-0.23*
	[0.08]	[0.07]	[0.11]	[0.12]	[0.11]	[0.12]	[0.06]	[0.06]
Constant	23.17*	34.72*	75.13*	73.43*	74.13*	62.64*	37.79*	38.39*
	[3.22]	[4.05]	[4.03]	[6.68]	[4.32]	[6.81]	[2.39]	[3.51]
Sample size	1,692	1,630	1,692	1,630	1,692	1,630	1,692	1,630
R^2	0.04	0.08	0.10	0.11	0.07	0.05	0.07	0.09

Dependent variables are scaled to 100 with higher values indicating worse mental health. Identity and work indicators are measured as z scores.

Heteroscedasticity robust standard errors are in parentheses, * indicates significant coefficeint at 5%. + indicates difference by age significant at 5%.

Appendix Table 6c. Relationships between emotional well-being and work and identity, and interactions among them by age and job role
Faculty stratified by age : less than 48y old and at least 48y at survey

Covariates	A. Change in mental health During-pre pandemic			B. Felt stressed out		C. Felt anxious		D. CES-D score		
	<48y [1]	≥48y [2]		<48y [1]	≥48y [2]	<48y [1]	≥48y [2]	<48y [1]	≥48y [2]	
A1. Identity indicators										
Work important to sense of self	1.43	-2.02		1.75	3.07	5.49*	6.45*	0.83	2.09*	
	[1.39]	[1.26]		[2.01]	[2.04]	[2.20]	[1.82]	[1.19]	[0.94]	
University not share my values	5.03*	1.93*		5.76*	5.60*	4.90*	5.61*	4.89*	4.66*	
	[1.62]	[0.92]		[1.91]	[1.40]	[2.26]	[1.39]	[1.36]	[0.82]	
A2. Work indicators										
More effort rel no covid	5.14*	3.35*		9.62*	7.91*	8.60*	5.00*	4.86*	2.44*	+
	[1.26]	[1.07]		[1.69]	[1.66]	[1.73]	[1.49]	[0.85]	[0.81]	
Accomplish less rel no covid	-0.8	1.88		-0.26	2.69	-0.29	2.13	0.26	2.30*	
	[1.13]	[1.10]		[1.59]	[1.67]	[1.66]	[1.52]	[0.86]	[0.82]	
B. Interactions										
Work important*	-3.30*	0.99	+	0.65	-0.59	-1.93	0.92	-0.37	-0.03	
University not share values	[1.50]	[1.08]		[1.93]	[1.47]	[2.05]	[1.50]	[1.15]	[0.89]	
More eff rel no COVID*	0.28	0.22		0.32	1.99	-1.33	1.57	-0.11	0.31	
Accomplished less	[1.07]	[0.94]		[1.38]	[1.31]	[1.49]	[1.29]	[0.76]	[0.79]	
More eff rel no COVID*	1.76	1.39		-0.52	2.33	0.07	2.73	0.43	2.15	
Work is important	[1.59]	[1.46]		[2.25]	[2.23]	[2.01]	[1.89]	[1.26]	[1.13]	
More eff rel no COVID*	1.24	1.23		-1.92	1.84	0.5	2.37	0.02	0.85	
University not share values	[1.53]	[1.00]		[1.87]	[1.27]	[2.31]	[1.32]	[1.56]	[0.89]	
Accomp less rel no COVID*	-0.74	-1.21		-0.82	-2.02	0.28	-0.92	-0.13	-2.1	
Work is important	[1.56]	[1.56]		[1.72]	[2.19]	[1.80]	[1.78]	[1.19]	[1.09]	
Accomp less rel no COVID*	-1.33	0.3		-1.66	1.18	-1.38	0.51	-0.17	0.49	
University not share values	[1.53]	[1.03]		[1.36]	[1.50]	[1.63]	[1.42]	[1.31]	[0.88]	
C.										
Male [indicator var]	2.03	-2.32		-4	-8.12*	-3.39	-7.39*	0.93	-6.78*	
	[2.44]	[1.70]		[3.12]	[2.70]	[3.38]	[2.64]	[1.89]	[1.36]	
Age [years]	0.04	-0.19*		-0.11	-0.55*	-0.41	-0.50*	-0.08	-0.22*	
	[0.21]	[0.10]		[0.28]	[0.17]	[0.31]	[0.15]	[0.16]	[0.08]	
Constant	13.61	25.58*		59.06*	77.51*	59.30*	65.04*	26.50*	37.00*	
	[8.12]	[5.82]		[11.10]	[10.28]	[12.31]	[9.14]	[6.43]	[4.78]	
Sample size	362	488		362	488	362	488	362	488	
R^2	0.12	0.107		0.133	0.2	0.109	0.175	0.154	0.233	

Dependent variables are scaled to 100 with higher values indicating worse emotional well-being. Identity and work covariates are measured as z scores.
Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%. + indicates difference by age significant at 5%

Appendix Table 6d. Relationships between emotional well-being and work and identity, and interactions among them by age and job role
Non-faculty stratified by age : less than 48y old and at least 48y at survey

Covariates	A. Change in mental health During-pre pandemic		B. Felt stressed out		C. Felt anxious		D. CES-D score	
	<48y [1]	≥48y [2]	<48y [1]	≥48y [2]	<48y [1]	≥48y [2]	<48y [1]	≥48y [2]
A1. Identity indicators								
Work important to sense of self	0.18	-0.01	2.22*	1.04	1.15	0.63	0.05	-0.31
	[0.54]	[0.61]	[0.76]	[0.83]	[0.78]	[0.79]	[0.43]	[0.47]
University not share my values	1.15	1.13*	2.74*	3.42*	1.13	1.84*	2.04*	1.78*
	[0.60]	[0.52]	[0.83]	[0.80]	[0.88]	[0.80]	[0.48]	[0.44]
A2. Work indicators								
More effort rel no covid	3.89*	3.89*	7.05*	7.83*	5.44*	5.02*	3.12*	3.36*
	[0.57]	[0.57]	[0.80]	[0.81]	[0.79]	[0.79]	[0.47]	[0.45]
Accomplish less rel no covid	0.87	2.33*	1.89*	0.62	1.76*	1.61*	1.25*	1.31*
	[0.57]	[0.56]	[0.74]	[0.81]	[0.78]	[0.81]	[0.44]	[0.45]
B. Interactions								
Work important*	0.21	0.08	0.31	0.91	0.52	1.29*	0.45	0.71
University not share values	[0.56]	[0.43]	[0.69]	[0.67]	[0.71]	[0.62]	[0.40]	[0.36]
More eff rel no COVID*	0.14	1.50*	1.57*	1.49*	2.06*	1.55*	0.52	1.23*
Accomplished less	[0.50]	[0.54]	[0.68]	[0.76]	[0.69]	[0.72]	[0.41]	[0.43]
More eff rel no COVID*	0.81	1.01	1.28	2.33*	0.56	1.39	0.34	0.83
Work is important	[0.52]	[0.59]	[0.76]	[0.77]	[0.74]	[0.74]	[0.43]	[0.47]
More eff rel no COVID*	1.78*	0.07	1.02	1.81*	0.61	1.31	1.12*	0.01
University not share values	[0.63]	[0.61]	[0.82]	[0.85]	[0.88]	[0.78]	[0.51]	[0.47]
Accomp less rel no COVID*	0.71	1.21	0.97	2.28*	0.77	1.4	0.21	1.35*
Work is important	[0.58]	[0.66]	[0.72]	[0.88]	[0.78]	[0.88]	[0.43]	[0.56]
Accomp less rel no COVID*	-0.62	-0.92	-1.39	-1.33	-0.98	-1.89*	-0.95*	-0.6
University not share values	[0.64]	[0.63]	[0.78]	[0.82]	[0.85]	[0.78]	[0.47]	[0.49]
C.								
Male [indicator var]	1.91	-4.59*	-5.37*	-7.32*	-5.79*	-6.37*	-0.92	-4.60*
	[1.21]	[1.02]	[1.65]	[1.67]	[1.69]	[1.68]	[0.94]	[0.85]
Age [years]	-0.08	-0.26*	-0.51*	-0.49*	-0.62*	-0.39*	-0.23*	-0.21*
	[0.08]	[0.07]	[0.11]	[0.12]	[0.11]	[0.12]	[0.06]	[0.06]
Constant	23.58*	33.68*	75.69*	71.73*	74.43*	61.20*	38.08*	37.78*
	[3.22]	[4.01]	[4.02]	[6.61]	[4.30]	[6.76]	[2.39]	[3.50]
Sample size	1692	1630	1692	1630	1692	1630	1692	1630
R^2	0.05	0.096	0.106	0.125	0.074	0.068	0.077	0.108

Dependent variables are scaled to 100 with higher values indicating worse emotional well-being. Identity amd work covariates are measured as z scores.
Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%. + indicates difference by age significant at 5%

Appendix Table 7. Relationships among work and identity-related indicators, controlling for household composition

Covariates	More effort rel to hypothetical of no Covid	Accomplish less rel to hypothetical of no Covid	Work is important to my sense of self	University not share my values	University not share my values
	[1]	[2]	[3]	[4]	[5]
Work is important to my sense of self	0.088*	0.014		-0.289*	-0.284*
	[0.017]	[0.016]		[0.016]	[0.016]
University not share my values	0.093*	0.059*	-0.290*		
	[0.016]	[0.017]	[0.018]		
More effort rel to hypothetical of no Covid		0.060*	0.082*	0.087*	0.085*
		[0.018]	[0.016]	[0.015]	[0.015]
Accomplish less rel to hypothetical of no Covid	0.059*		0.013	0.054*	0.051*
	[0.018]		[0.015]	[0.015]	[0.015]
Work important * More eff rel no COVID					0.031*
					[0.016]
Work important * Accomp less rel no COVID					0.050*
					[0.016]
Number of household members aged					
<5years	0.098*	0.121*	-0.059	0.089	0.087
	[0.049]	[0.047]	[0.047]	[0.047]	[0.048]
5 - 14 years	0.148*	0.060*	0.002	-0.017	-0.02
	[0.029]	[0.030]	[0.027]	[0.027]	[0.027]
15 - 19 years	0.071	-0.015	0.032	0.002	0.004
	[0.036]	[0.042]	[0.039]	[0.043]	[0.042]
>19 years	-0.031	-0.021	0.047*	0.021	0.02
	[0.026]	[0.024]	[0.021]	[0.022]	[0.022]
[1] if completed household roster	0.048	0.024	-0.069*	-0.049	-0.049
	[0.031]	[0.031]	[0.030]	[0.030]	[0.030]
Constant	-0.074	-0.027	-0.011	-0.002	-0.003
	[0.040]	[0.039]	[0.036]	[0.036]	[0.036]
Sample size	4,172	4,172	4,172	4,172	4,172
R2	0.026	0.011	0.09	0.093	0.097
F(joint significance all covariates)	13.35	5.139	37.68	47.12	39.1
[p value]	0.000	0.000	0.000	0.000	0.000

Identity, effort and accomplishment covariates are measured as z scores. Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%

Appendix Table 8. Relationships between emotional well-being, work and identity, with interactions, controlling household composition

Covariates	Worsened overall mental health ([3]-[2]) [1]	Overall poor mental health at survey [2]	Overall poor mental health pre-pandemic [3]	Felt stressed out [4]	Felt anxious [5]	CES-D score [6]
A1. Identity indicators						
Work important to sense of self	-0.31	-1.70*	-1.39*	1.65*	1.26*	-0.13
	[0.36]	[0.42]	[0.31]	[0.51]	[0.51]	[0.29]
University not share my values	1.44*	2.59*	1.15*	3.55*	2.17*	2.46*
	[0.36]	[0.42]	[0.29]	[0.50]	[0.51]	[0.29]
A2. Work indicators						
More effort rel no covid	3.82*	2.97*	-0.86*	7.65*	5.30*	3.26*
	[0.35]	[0.41]	[0.28]	[0.50]	[0.49]	[0.28]
Accomplish less rel no covid	0.97*	0.90*	-0.07	1.26*	1.36*	1.03*
	[0.35]	[0.39]	[0.28]	[0.48]	[0.49]	[0.27]
B. Interactions						
More eff rel no COVID*Accomp less	0.41	0.83*	0.42	1.46*	1.41*	0.55*
	[0.33]	[0.37]	[0.26]	[0.45]	[0.44]	[0.26]
Work important*More eff rel no COVID	0.86*	0.72	-0.15	1.73*	1.12*	0.62*
	[0.36]	[0.41]	[0.32]	[0.50]	[0.48]	[0.29]
Univ not share values*More eff rel no COVID	1.15*	0.90*	-0.25	1.33*	1.23*	0.70*
	[0.39]	[0.43]	[0.29]	[0.51]	[0.51]	[0.32]
Work important*Accomp less rel no COVID	0.54	0.39	-0.15	1.10*	1.02*	0.53
	[0.39]	[0.42]	[0.32]	[0.50]	[0.52]	[0.30]
Univ not share values*Accomp less rel no COVID	-0.62	-0.63	-0.01	-1.03*	-0.99*	-0.4
	[0.40]	[0.42]	[0.29]	[0.48]	[0.50]	[0.30]
Univ not share values*Work important	0.14	0.68	0.54*	0.71	0.97*	0.62*
	[0.33]	[0.38]	[0.27]	[0.44]	[0.44]	[0.25]
C. Sex and age						
Male [indicator var]	-1.66*	-4.55*	-2.89*	-5.85*	-6.01*	-3.06*
	[0.68]	[0.83]	[0.58]	[0.99]	[1.01]	[0.54]
Age [years]	-0.20*	-0.52*	-0.33*	-0.58*	-0.58*	-0.25*
	[0.03]	[0.03]	[0.02]	[0.04]	[0.04]	[0.02]
D. Household composition						
Number of household members aged						
<5years	0.4	-0.87	-1.27	0.84	-0.58	-2.47*
	[0.94]	[1.08]	[0.80]	[1.37]	[1.42]	[0.79]
5 - 14 years	-0.33	-1.81*	-1.48*	-0.21	-0.72	-1.43*
	[0.59]	[0.72]	[0.48]	[0.89]	[0.85]	[0.46]
15 - 19 years	0.31	0.63	0.32	0.2	-1.37	-0.44
	[0.87]	[0.98]	[0.75]	[1.20]	[1.20]	[0.65]
>19 years	0.61	-0.48	-1.09*	0.03	-1.11	-0.77
	[0.52]	[0.56]	[0.41]	[0.67]	[0.71]	[0.43]
[1] if completed household roster	-0.77	-0.92	-0.15	0.63	0.38	-0.56
	[0.63]	[0.75]	[0.54]	[0.91]	[0.94]	[0.51]

Constant	27.98* [1.62]	70.33* [1.82]	42.36* [1.39]	77.19* [2.20]	73.69* [2.30]	41.23* [1.28]
Sample size	4,172	4,172	4,172	4,172	4,172	4,172
R2	0.074	0.124	0.077	0.169	0.121	0.127
F test statistics (p values)						
2. Accomplished less	0.000	0.000	0.007	0.000	0.000	0.000
1. More effort	0.001	0.002	0.593	0.000	0.000	0.000
3. Work important	0.021	0.000	0.000	0.000	0.000	0.010
4. University shares values	0.000	0.000	0.000	0.000	0.000	0.000
5. All interactions taken together	0.004	0.011	0.304	0.000	0.000	0.001

Dependent variables are scaled to 100 with higher values indicating worse emotional well-being. Identity and work covariates are measured as z scores.
Heteroscedasticity robust standard errors are in parentheses, * indicates significant at 5%.