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Autonomy support and prosocial impact facilitate meaningful work: A daily diary study

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Abstract

This study pays attention to within-person fluctuations in meaningful work and its antecedents and consequences. Considering self- and other-oriented dimensions as crucial pathways to meaningful work, effects of daily perceived autonomy support and prosocial impact on one's meaningful work were examined. A daily diary study was conducted in which 86 nurses from varied hospitals reported their work experiences for 10 consecutive workdays (860 occasions). Results of multilevel modeling showed that both day-level perceived autonomy support and prosocial impact were positively related to day-level meaningful work, which served as the mediator between them and work engagement. Prosocial orientation strengthened the positive relationship between day-level perceived prosocial impact and day-level meaningful work. However, autonomy orientation negatively moderated the effect of day-level perceived autonomy support on day-level meaningful work, suggesting the necessity to distinguish between assisted and asserted autonomy orientation. Our findings illustrate the transient and dynamic nature of meaningful work and provide empirical evidences linking suggested managerial practices to employees' meaningful work.

Keywords Autonomy support · Prosocial impact · Meaningful work · Work engagement · Autonomy orientation · Prosocial orientation

Introduction

In recent years, meaningful work has become a topic of burgeoning interest among organizational psychologists and managerial practitioners due to growing concerns over job quality, increasing emphasis on work as a domain for one to find purpose (Bailey et al., 2019; Lepisto & Pratt,

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2017; Meng et al., 2022), and the finding of a series of desirable outcomes (e.g., job satisfaction, organizational commitment) as a result of meaningful work (Allan et al., 2019; Pratt & Ashforth, 2003). Meaningful work is broadly defined as work significance (Wang et al., 2022), which describes the overall sense of intrinsic value that one gains from work (Lepisto & Pratt, 2017). To date, both empirical and review papers have demonstrated the dynamic surroundings facilitating meaningful work (e.g., Bailey et al., 2017; Pratt & Ashforth, 2003; Lysova et al., 2019). Given that most studies examined a single source of meaningful work at a time, Bailey et al. (2019) pointed out that employees are more likely to experience meaningful work when they are connected to diverse sources of work meaningfulness rather than simply one, and called for future empirical research examining multiple sources of meaningful work simultaneously (Allan, 2017; Martela et al., 2021).

This study answers the call for the simultaneous examination of multiple sources of meaningful work (Allan, 2017; Bailey et al., 2019; Martela et al., 2021) by considering both self- and other-oriented dimensions (i.e., perceived autonomy support and prosocial impact respectively) as Fig. 1 Hypothesized model and path analysis results Note. Coefficients are unstandardized. * p < .05, ** p < .01, *** p < .001



two separate sources of meaningful work. Autonomy support is defined as the autonomy-supportive leadership that one receives in the work surroundings, which is characterized by the provision of relevant information, options and feedback in a non-controlling way, and the opportunity to self-inspire and self-regulate rather than being forced to act in a certain way (Deci et al., 1982). Such organizational practices that give employees more freedom to decide their goals and have more control over their work, are supposed to give employees a sense of self-realization, thus improving their perceptions of work meaningfulness (Lepisto & Pratt, 2017; Martela & Pessi, 2018). Prosocial impact describes a work experience of helping others at work, and is defined as the degree to which one's work and/or work behavior benefits others (Grant & Campbell, 2007). If the work environment allows employees to learn that their work has a positive impact on others' well-being, they would better realize that they are serving a broader purpose through their work (Meng & Wang, 2023), thus strengthening their perceived work significance (Hackman & Oldham, 1980; Martela & Pessi, 2018). Moreover, work engagement is further identified as our focal well-being outcome variable. Kahn (1990) argued that people are more likely to be engaged at work when they find it psychologically meaningful, which makes work engagement a direct outcome of meaningful work. We thus propose that meaningful work may serve as a mediator between autonomy support/prosocial impact and work engagement.

We especially pay attention to nurses who are frequently confronted with varied medical issues and suffering from stress-related disorders. Fostering a strong sense of meaningful work is therefore important for their well-being as well as their engagement at work. In addition, we adopt a with-person approach by using the daily diary method, investigating how fluctuations of meaningful work covary with daily fluctuations of perceived autonomy support and prosocial impact. In this way, we highlight the necessity to empirically examine within-person fluctuations of meaningful work over time (Bailey & Madden, 2017), which complements most existing studies that adopted the traditional static view of meaningful work and operationalized it as a stable state (e.g., Allan et al., 2019; Bailey et al., 2019; Lepisto & Pratt, 2017; Martela et al., 2021).

While beneficial on the whole, the positive effects of perceived autonomy support and prosocial impact on meaningful work may vary because individuals may differ in terms of how they perceive the importance and appeal of work environment (Kristof-Brown et al., 2005; Lysova et al., 2019). That is, individual difference factors may shape the boundary condition for the effects of autonomy support and prosocial impact on meaningful work (Barrick et al., 2013). This study thus introduces autonomy orientation and prosocial orientation as moderators of respective paths link-ing meaningful work and its sources. It is worth noting that while perceived autonomy support and prosocial impact are fluid and may vary from day to day, autonomy orientation and prosocial orientation are trait-like variables in nature and relatively stable.

All in all, we aim to build a theoretical model to observe within-person fluctuations in meaningful work and examine its antecedents and outcome (Fig. 1). Our research aims to have several implications. First, as it is important to test factors within the organizational context that simultaneously boost meaningful work, we examine autonomy support and prosocial impact as antecedents of meaningful work. Second, we believe the interaction between antecedents of meaningful work to be a fruitful area for potential research, and thus examine how individual orientations would set boundary conditions for the mechanism through which one would experience meaningful work. Third, we examine meaningful work and related constructs with daily variations, echoing to recent managerial scholars' calls for more research attention to the dynamic nature of variables in the organizational behavior domain (e.g., meaningful work).

Literature review and hypotheses development

What makes work meaningful: Autonomy support and prosocial impact

Early studies on meaningful work were heavily influenced by the job design theory and emphasized work characteristics. According to the job characteristics model (Hackman & Oldham, 1980), five job characteristics (i.e., task identity, task significance, skill variety, autonomy, feedback) contribute to work meaningfulness (Fried & Ferris, 1987). While the job design perspective is highly influential, Pratt and Ashforth (2003) argued that organizations can influence work meaningfulness not only by changing what employees do, but also by shaping the context within which the work is performed. As social beings, people cannot experience meaningfulness entirely within themselves, but have to seek to understand their place in the wider world and their contributions to society in the organizational context (Pratt & Ashforth, 2003; Michaelson, 2011; Tablan, 2015). Indeed, organizations create settings that are more or less conducive to one's search for meaning (Bailey et al., 2017; Lips-Wiersma & Morris, 2009). Therefore, it is important for researchers to figure out factors within the organizational context that would strengthen meaningful work (Lysova et al., 2019; Michaelson et al., 2014).

Bailey et al. (2019) suggested that employees are more likely to experience meaningful work when connected to diverse sources of work meaningfulness rather than a single one (Rosso et al., 2010; Schnell et al., 2013). Based on the conceptualization of Martela and Pessi (2018), we pay attention to self-realization and broader purpose, the two potential sources of meaningful work. Thus, the next step involves the exploration of factors which contribute to either self-realization or broader purpose. Considering the important role of dynamic organizational surroundings in shaping individual experience of meaningful work, this research therefore introduces autonomy support and prosocial impact, which derive from the work situations employees experience at work, as separate sources of meaningful work.

Autonomy support

According to the definition of self-realization, we believe that organizational practices that provide employees more freedom to set their own goals and have more control in their work, are supposed to facilitate self-realization (Martela & Pessi, 2018). In this study, we thus introduce autonomy support as one source of meaningful work. Autonomy is derived from self-determination theory (SDT, Deci & Ryan,

1985), an overarching theory of motivation that considers one's innate growth propensity and proposes several basic p within leader-membe. Applied across varied domains (e.g., Ng et al., 2012; Reeve, 2015; Ryan & Deci, 2017), a research question of broad interest to SDT researchers in the organizational behavior domain has been the contextual factors that satisfy employees' basic psychological needs (Fang et al., 2022; Van den Broeck et al., 2016). Considering that the motivation and optimal functioning of employees are largely driven by leaders' behaviors, scholars have extensively examined ways in which leaders can positively affect employees' attitudes and behaviors (e.g., Gagné et al., 2018; Reeve, 2015; Slemp et al., 2018). Leader autonomy support promotes a climate of support and understanding within leader-member exchange relationships (Reeve, 2015), which motivates employees to engage in a wide range of self-regulated behaviors such as feedback seeking (Beenen et al., 2017). As recipients of autonomy support perceive themselves to be the regulators and controllers of their own work behaviors, that is, their behaviors are internally directed rather than externally controlled (Deci et al., 2017), autonomy support is supposed to give them a sense of selfrealization (Beenen et al., 2017; Grant & Ashford, 2008), thus improving their perceptions of work meaningfulness (Bailey et al., 2017; Martela & Pessi, 2018).

Prosocial impact

Prosocial impact describes the degree to which one perceives one's own work behavior to benefit others (Grant & Campbell, 2007). One may argue that prosocial impact is more closely related to work content rather than work context. However, even doctors who make significant contributions to the society may underestimate their work meaningfulness if the work context does not allow them to fully realize their work's prosocial impact (Grant, 2008). The more employees feel that their work has a positive prosocial impact on others' well-being, the more they should feel that they are serving a higher purpose through their work (Hackman & Oldham, 1976, 1980). We thus introduce prosocial impact as another source of meaningful work.

In the past decade, scholars have confirmed the positive effect of having prosocial impact or promoting the wellbeing of others at work (Grant, 2008). The proposition that prosocial impact works as a source of work meaningfulness is supported by evidences accumulated across cultures (Schwartz & Bardi, 2001), occupations and industries (Colby et al., 2001). It was found that employees can better experience the prosocial impact of their work when connected to beneficiaries of their work (Grant, 2008), such as when radiologists receive the profile photo of their patients. When employees realize such profound prosocial impact, they thereby perceive their work to be more meaningful and are motivated to work even harder (Michaelson et al., 2014).

It is worth noting that perceiving one's work to be meaningful is not necessarily a stable psychological state (Bailey & Madden, 2017). Rather, for many employees, their work may have fluctuating levels of meaningfulness because of different social contexts and experiences at work (Bailey et al., 2017). Likewise, individual perceptions of autonomy support and prosocial impact may also vary across time due to different work conditions and/or contexts on each workday. Therefore, we decide to examine these variables at the daily level so as to capture their temporal dynamics.

Hypothesis 1 *Day-level perceived autonomy support is positively related to day-level meaningful work.*

Hypothesis 2 *Day-level perceived prosocial impact is positively related to day-level meaningful work.*

The mediating role of meaningful work

Previous studies have confirmed that the experience of meaningful work is associated with a series of favorable outcomes for both individuals and organizations (Allan et al., 2019), among which work engagement is frequently mentioned. Kahn (1990) first proposed the construct of work engagement, and defined it as the extent to which an employee is cognitively, emotionally, and physically engaged in one's role performance. Schaufeli and colleagues (2002) further defined it as a work-related positive psychological state characterized by vigor, dedication and absorption, which may fluctuate over time rather than is a relatively stable personal trait (Kahn, 1990).

Early scholars believe that meaningful work as a motivational force would propel individuals toward goal-directed behaviors and bring about positive affective states (Hackman & Oldham, 1976). Indeed, empirical studies consistently showed that meaningful work significantly predicts work engagement (e.g., Ahmed et al., 2016; Geldenhuys et al., 2014; May et al., 2004), and both longitudinal survey (e.g., Lee et al., 2017) and experiments (e.g., Cantarero et al., 2022) have been undertaken to examine the causal relationship between the two variables. Likewise, there is evidence supporting the causal effect of autonomy support on the sense of self-regulation or self-realization (e.g., Meuwissen & Carlson, 2019) which facilitates one's perception of work meaningfulness (Bailey et al., 2017). In addition, previous experimental studies have suggested that prosocial impact predicts meaningful work (e.g., Grant et al., 2007; Grant et al., 2008; Michaelson et al., 2014). Taken together, we propose that:

Hypothesis 3 Day-level meaningful work fully mediates the positive relationship between day-level perceived autonomy support and day-level work engagement.

Hypothesis 4 Day-level meaningful work fully mediates the positive relationship between day-level perceived prosocial impact and day-level work engagement.

The moderating role of individual orientations

To achieve a comprehensive understanding of how meaningful work is perceived by different individuals (Lysova et al., 2019), this study further explores the moderating roles of autonomy orientation and prosocial orientation in respective pathways.

Autonomy orientation

People differ in how they interpret their own behaviors due to dispositional differences (Deci & Ryan, 1985). According to SDT, autonomy orientation is defined as the tendency towards high degrees of internalized self-regulation and the inclination to think that behaviors come from the self. Other things being equal, individuals with high autonomy orientation are more likely to experience their behaviors as free and volitional, which accord with one's own standards and beliefs (Deci & Ryan, 1985; Liu & Fu, 2011). Autonomy orientation may encourage one to perceive existing situations as more autonomy supportive, search for chances for self-determination, and then prepare actions based on personal goals and interests rather than external controls and constraints (Deci & Ryan, 1985). Therefore, individuals with high autonomy orientation are more likely to catch situational cues created by autonomy supportive climate brought by their leaders, and perceive more opportunities to exercise their freedom in making choices (Liu & Fu, 2011), which contributes to meaningful work. Thus, compared with those with low autonomy orientation, the positive effect of day-level leader autonomy support on day-level meaningful work may be greater for those with high autonomy orientation. We further propose that the indirect effect of day-level perceived autonomy support on day-level work engagement via day-level meaningful work would also depend on one's autonomy orientation.

Hypothesis 5 Autonomy orientation positively moderates the relationship between day-level perceived autonomy support and day-level meaningful work, such that the positive relationship would be stronger for highly autonomy-oriented individuals, but weaker for less autonomy-oriented individuals.

Hypothesis 6 Autonomy orientation positively moderates the indirect relationship between day-level perceived autonomy support and day-level work engagement via day-level meaningful work, such that the relationship would be stronger for highly autonomy-oriented individuals, but weaker for less autonomy-oriented individuals.

Prosocial orientation

The interactionist perspective is adopted to examine the joint influence of contextual prosocial impact and one's prosocial orientation. Prosocial orientation is consistently defined as the tendency to focus on the needs of others and to improve others' welfare (Batson & Shaw, 1991; Grant et al., 2009). Individuals with high prosocial orientation pay attention to others' mood changes, devote themselves to improving the well-being of others, try their best to meet the needs of others, and engage in more prosocial behaviors (Ornaghi et al., 2015). Therefore, compared with those with low prosocial orientation, individuals with high prosocial orientation better capture situational cues that signal their work's potential prosocial impact, perceive greater need and more opportunity to help others (Grant et al., 2009), and thus strengthen their own perceptions of work meaningfulness. We further propose that the indirect effect of day-level perceived prosocial impact on day-level work engagement via day-level meaningful work would also depend on one's prosocial orientation.

Hypothesis 7 Prosocial orientation positively moderates the relationship between day-level perceived prosocial impact and day-level meaningful work, such that the relationship would be stronger for highly prosocial-oriented individuals, but weaker for less prosocial-oriented individuals.

Hypothesis 8 Prosocial orientation positively moderates the relationship between day-level perceived prosocial impact and day-level work engagement via day-level meaningful work, such that the relationship would be stronger for highly prosocial-oriented individuals, but weaker for less prosocial-oriented individuals.

Method

Participants and procedure

Nurses were deliberately chosen as our research subjects. As a typical profession serving others, nurses often have to face numerous and complicated medical issues, ranging from the death of a patient to the minor complaint from a family member, which may bring either great or light mental burden and emotional exhaustion to them. Thus, gaining a high perception of work meaningfulness is particularly important for them. Besides, most nurses work in a more or less autonomy supportive environment, and their work has profound prosocial impact, which allowed us to explore roles of perceived autonomy support and prosocial impact in work meaningfulness perception.

Using a convenience sample based on existing social networks, our research team got support and permission from relevant leaders of the hospitals in which the survey took place. We introduced the purpose of the survey and guaranteed the confidentiality of the responses. Nurses who were willing to participate in this study were recruited. Data were collected on the MikeCRM platform (a Chinese online survey platform). In the first stage (November, 2019), we collected participants' demographics (e.g., age, and educational level) and measured their personal characteristics (i.e., autonomy orientation, and prosocial orientation). After one week, the second phase of the survey took place, which lasted around half a month¹. Participants were instructed to fill in a daily diary questionnaire, which includes daily perceived autonomy support from the head nurses and perceived prosocial impact of their work, as well as their daily perceptions of work meaningfulness and work engagement. In this phase, we sent the directed electronic questionnaire links to participants at the end of each working shift (e.g., 6:00 pm) and asked them to fill in the questionnaire at the required time period (e.g., $6:00 \text{ pm to } 9:00 \text{ pm})^2$. One hour after the onset of the time period, WeChat messages would

¹ Note. Given that the nurses' working pattern in the target hospital is three days' work with one day off, our second round of data collection lasted around half a month to obtain adequate data of ten working days for each participant.

² Note. The nature and pattern of nurses' work makes it difficult to collect diary data. Even though nurses with the same shift were recruited if possible, inevitably there were inconsistent working hours among the participants. In addition, the nurses were very busy at work during the whole workday. Therefore, it was hard to collect data at multiple points each day as we already asked them to fill in the questionnaire

be sent to remind those who did not complete their questionnaires. Each nurse was given a specific link to ensure the effective collection and matching of data. This approach also protected their confidentiality, as the researchers added each participating nurse on WeChat while never asked for their identifiable personal information (e.g., Name and work ID). We patiently answered any questions the participants raised during the survey to build trust with them. Our research was approved by the Internal Review Board of the researchers' affiliation. All participants provided written informed consent before taking each survey.

126 participants signed up to take part in this study, which is an acceptable sample size suggested by previous studies (e.g., Ohly et al., 2010). After removing the participants who did not meet our inclusion criteria (i.e., if the survey was not filled on more than two days or within the required time period, or if the responses were consistently the same, the participant's data would be discarded), the final sample consisted of 86 respondents with a total of 860 diary days (86 participants \times 10 daily surveys). Results of the postdoc statistical power analysis using G*Power showed that a statistical testing power $(1-\beta)$ of 0.8 was detected for a moderate correlation effect size ($\rho = 0.3$) with a target significance level (α) of 0.05 or less. Considering that the nature of nurses' work makes it highly difficult to collect diary data in large scale, a statistical testing power of 0.8 is generally sufficient and acceptable (Cohen, 1988; Ohly et al., 2010). The mean age of the included nurses was 27.64 years (SD=3.81). 46.5% of the medical staffs had been working in this profession for 5-10 years, followed by 39.5% for less than 5 years and another 10.5% for 10-15 years. As for educational level, the majority of participants received a bachelor's degree (80.2%). Demographics of the excluded nurses (N=40) were also analyzed. The results showed that the mean age of the sample was 28.03 years; 78.9% of them had gained a bachelor's degree; 54.4% of them had worked in this profession for 5-10 years. Our one-way ANOVA results showed that there exist no significant differences between the excluded nurses and the included ones among their age (p > .05), educational level (p > .05), or work tenure (p > .05).

Measures

We adapted the following scales based on the established scales which had been validated by numerus studies. Items were cautiously revised to fit the nursing profession as well as to measure daily fluctuations. Responses were given on a seven-point scale, ranging from 1 (totally disagree) to 7 (totally agree). More details are introduced below. **Day-level perceived autonomy support** was measured with the brief version of the Work Climate Questionnaire (WCQ) developed by Deci et al. (1982). Previous studies had confirmed its good reliability among Chinses samples (e.g., Nie et al., 2015). This scale contained 6 items to evaluate nurses' perception of autonomy support at work from their head nurses at a daily level. A sample item was "Today, the head nurse encourages me to ask questions at work." The average within-level reliability coefficient (Cronbach's alpha) across ten working days was 0.96.

Day-level perceived prosocial impact was assessed with the 3-item scale developed by Grant (2008), which had been proven to have high reliability by many empirical studies adopting Chinese samples (e.g., Zhu & Akhtar, 2014). A sample item was "I am aware of how my work today will help others (e.g., colleagues, patients and their family)". The average within-level reliability coefficient (Cronbach's alpha) across ten working days was 0.94.

Day-level meaningful work was measured with the Work and Meaning Inventory (WAMI) developed by Steger et al. (2012). Previous empirical studies which recruited Chinese participants confirmed its high reliability (e.g., Cai et al., 2018). The scale contained 10 items, which measured meaningful work from three dimensions: 4 items for positive meaning with a sample item of "Today, my work is meaningful"; 3 items for meaning making through work with a sample item of "Today, my work is conducive to my personal growth"; and 3 items for greater good motivation with a sample item of "Today, my work serves a very important purpose". The average within-level reliability coefficient (Cronbach's alpha) for the whole scale across ten working days was 0.93.

Day-level work engagement was measured with the Utrecht Work Engagement Scale (UWES) developed by Schaufeli et al. (2002), which had been proven to have high reliability by many empirical studies with Chinese samples (e.g., Fong & Ng, 2012). The scale contained 16 items, which measured work engagement from three dimensions, namely vigor, dedication and absorption. Sample items were "Today, I feel full of energy at work" for vigor; "Today, I am full of enthusiasm about work" for dedication; "I was immersed in the work I had done today" for absorption, respectively. The average within-level reliability coefficient (Cronbach's alpha) for the whole scale across ten working days was 0.97.

Autonomy orientation was assessed with the General Causality Orientations Scale (GCOS; Deci & Ryan, 1985). Existing research with Chinese samples proved its high reliability (e.g., Liu & Fu, 2011; Fang et al., 2022). The scale contained 12 scenarios, each accompanied with 2 distinct choices that respectively measure one's autonomy or control orientations. Respondents read 12 hypothetical

every day. As such, we chose to measure all variables at a given time point each day.

Table 1	Means.	standard	deviations	and	correlations	of	the	research	variables
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Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1. Age	27.64	3.81	/	0.386**	0.852**	-0.019	0.003	-0.094	0.011	-0.001	0.043
2. Education	2.81	0.45	0.386**	/	0.288**	-0.008	0.037	0.012	0.095	0.032	0.045
3. Work tenure	1.78	0.77	0.853**	0.288**	/	-0.139	-0.006	0.019	0.074	0.125	0.134
4. Autonomy orientation	1.27	1.04	-0.019	-0.008	-0.139**	/	0.323**	-0.021	0.083	-0.022	-0.014
5. Prosocial orientation	5.77	1.09	0.003	0.037	-0.006	0.347**	/	0.397**	0.547**	0.528**	0.450**
6. Day-level perceived autonomy support	4.99	1.35	-0.082*	0.010	0.016	-0.018	0.347**	/	0.861**	0.857**	0.822**
7. Day-level perceived prosocial impact	5.27	1.18	0.009	0.080*	0.062	0.070*	0.456**	0.732**	/	0.885**	0.806**
8. Day-level meaningful work	5.08	1.08	-0.001	0.029	0.111**	-0.019	0.468**	0.747**	0.784**	/	0.901**
9. Day-level work engagement	3.65	0.79	0.037	0.039	0.116**	-0.012	0.390**	0.719**	0.690**	0.831**	/

Notes. N = 86 participants (860 occasions). Means, standard deviations, and correlations represent group-mean centered relationships at the within-individual level of analysis. Correlations below the diagonal are correlations on the within-person level (i.e., day level) and correlations above the diagonal are correlations on the between-person level. * p < .05, ** p < .01, *** p < .001

Table 2 Comparison of measurement models

Models	X^2	df	X²/df	RMSEA (90%CI)	SRMR	CFI	TLI
Hypothesized four-factor model: AS, PI, MW, WE	634.681	129	4.92	0.05 [0.001, 0.102]	0.05	0.89	0.90
Alternative three-factor model: AS, PI, MW+WE	822.362	132	6.23	0.06 [0.010, 0.110]	0.06	0.78	0.80
Alternative two-factor model: AS + PI, MW + WE	1440.501	134	10.75	0.08 [0.012, 0.148]	0.10	0.66	0.57
Alternative single-factor model: AS + PI + MW + WE	2195.110	135	16.26	0.18 [0.075, 0.285]	0.18	0.56	0.55

Note. N = 860 occasions (within-individual level). AS = Autonomy support, PI = Prosocial impact, MW = Meaningful work, WE = Work engagement. "+" represents two factors merged into one

scenarios regarding diverse social situations and rated the likelihood of reacting to each scenario with the two distinct manners respectively measured by the 2 items. One item measured the autonomy-oriented response, while the other represented the control-oriented response. One sample scenario was as follows: "You have been offered a new position in a company, where you have worked for some time. The first question that is likely to come to mind is: Item 1) I wonder if the new work will be interesting (representing autonomy orientation); Item 2) I wonder if I can make more money in my new position (representing control orientation)". The Cronbach's alpha of the autonomy orientation sub-scale and the control orientation sub-scale was 0.82 and 0.78, respectively. In accordance with previous literatures, we subtracted the mean value of control orientation items from the mean value of the autonomy orientation items to reflect one's relative autonomy orientation (e.g., Kasser & Ahuvia, 2002).

Prosocial orientation was assessed with the 4-item scale developed by Grant and Sumanth (2009). Previous empirical studies with Chinese samples confirmed its high reliability (e.g., Shao et al., 2017). A sample item was "It's important for me to be able to help others in my work". Cronbach's alpha of this scale was 0.86.

Control variables. We controlled for demographics (i.e., age, education level and work tenure). Education level was coded as: 1 = senior school or below, 2 = junior college, 3 = bachelor's degree, 4 = master's degree or above; work

tenure was coded as: 1 = less than 5 years, 2 = 5-10 years, 3 = 10-15 years, 4 = 15-20 years. Given that results of our theoretical model without controls were identical with the model with controls, we excluded these controls in our following analyses for the sake of simplicity (Becker et al., 2016).

Results

Preliminary analysis

Means, standard deviations and correlation coefficients among all variables were reported in Table 1. We conducted a confirmatory factor analysis (CFA) with maximum likelihood estimation to assess the discriminant validity of perceived autonomy support, perceived prosocial impact, meaningful work and work engagement since they, as within-individual level variables, were collected at the same phase of the survey. The typical method for achieving identification (i.e., fixing one factor loading for each endogenous latent variable at unity; Steiger, 2002) was used to obtain an identifiable CFA solution. We used the balancing parceling approach (i.e., the item with the highest itemscale correlation is paired with the item that has the lowest item-scale correlation) to improve our low sample size to items ratio (Kline, 2005; Little et al., 2013), and the results were shown in Table 1. Fit indices for the four-factor model

Table 3	Multilevel	path	analysis	results
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	Day-level meanir	ngful work					Day-level work engagement
	M1	M2	M3	M4	M5	M6	M7
Intercept	3.703***(0.078)	3.841***(0.053)	3.712***(0.085)	5.082***(0.086)	3.967***(0.010)	4.856***(0.027)	3.654***(0.065)
Variables at t	the within-person	level					
Day-level perceived autonomy support (AS)	0.115**(0.034)		0.113**(0.078)	0.110**(0.056)			
Day-level perceived prosocial impact (PI)		0.281***(0.043)			0.289***(0.034)	0.276***(0.078)	
Day-level meaningful work							0.396***(0.039)
Variables at t	the between-perso	on level					
Autonomy orientation (AO)			-210**(0.023)	-0.208**(0.085)			
Prosocial orientation (PO)					0.559***(0.023)	0.528***(0.080)	
Cross-level in	iteraction						
$AS \times AO$				-0.045**(0.017)			
$PI \times PO$						0.076**(0.034)	
F	100.71***	112.38***	98.93***	99.34***	111.37***	113.21***	0.99.87***
Adjusted R ²	0.481	0.531	0.479	0.501	0.567	0.603	0.550

Notes. N = 86 at the between-person level with 860 occasions at the within-person level. * p < .05, ** p < .01, *** p < .001. Standard errors (SE) of the unstandardized coefficients are shown in the parentheses on the right side of the coefficients. Day-level perceived autonomy support, day-level perceived prosocial impact, day-level meaningful work and day-level work engagement were person-mean centered; Autonomy orientation and prosocial orientation were grand-mean centered

 $[\chi 2/_{df} = 4.92 (<5); CFI = 0.89 (>0.80); TFI = 0.90 (>0.80); RMSEA = 0.05 (<0.08); SRMR = 0.05 (<0.08)] (Browne & Cudeck, 1993) were better than other alternative models.$

Due to the multilevel structure of the data, where daylevel measurements (within-person level, 860 occasions) of the constructs are nested within individuals (betweenperson level, N=86 participants), we performed multilevel path analysis with MPlus version 7.0 (Muthén & Muthén, 1998–2017). Before hypotheses testing, we ran a series of null models to examine the between- and within-person variance components of day-level constructs by calculating the intraclass correlation coefficient (ICC). Results showed that daily meaningful work (23%) fluctuated substantially within individuals across days, as did day-level perceived autonomy support (31%), day-level perceived prosocial impact (29%) and day-level work engagement (27%). Therefore, we concluded that there were significant amounts of between- and within-person variances in all day-level measurements.

Hypotheses testing

The multilevel path analysis results were presented in Table 3; Fig. 1. First, the direct effects of day-level perceived autonomy support and prosocial impact on day-level meaningful work were tested by using random coefficient models (RCMs; Raudenbush & Bryk, 2002). Results showed that both day-level perceived autonomy support (M1, b = 0.115, p = .001) and day-level perceived prosocial impact (M2, b=0.281, p<.001) were positively related to day-level meaningful work, supporting Hypothesis 1 and 2. In addition, day-level meaningful work was positively related to day-level work engagement (M7, b = 0.396, p < .001). We performed the Sobel test in which the combined effects of the path between the independent variable and the mediator and the path between the mediator and the dependent variable were examined (Sobel, 1982). The result turned out significant for both the mediation effect of day-level meaningful work on the relationship between day-level perceived autonomy support and day-level work engagement (Sobel test statistic = 3.209, p = .001), and the mediation effect of day-level meaningful work on the relationship between

Fig. 2 The moderating effect of autonomy orientation (AO) on the relationship between perceived autonomy support and meaningful work



day-level perceived prosocial impact and day-level work engagement (Sobel test statistic = 5.495, p < .001).

To further assess the significance of the mediation, we conducted Monte Carlo simulations with 5,000 replications and computed 95% confidence intervals (Bauer et al., 2006). Results showed the indirect effect of day-level perceived autonomy support on day-level work engagement via day-level meaningful work was significant (indirect effect = 0.046, 95%CI [0.002, 0.090]). Similarly, the estimate for the indirect effect of day-level prosocial impact on day-level work engagement via day-level meaningful work was 0.112, with a 95% CI of [0.081, 0.143]. Thus, Hypothesis 3 and 4 were supported.

Furthermore, the cross-level moderating effects of individual orientations were tested in path-analytical models with a moderator at the between-person level. Following previous studies (e.g., Eatough et al., 2016; Ilies et al., 2017), the moderator and the control variables at the between-person level were grand-mean centered, whereas the other variables at the within-person level were personmean centered (Hofmann & Gavin, 1998). We tested the conditional effects of day-level autonomy support and prosocial impact on day-level meaningful work at higher (1 SD above the mean) and lower (1 SD below the mean) levels of individual orientations (Bauer et al., 2006; Preacher et al., 2007). The results showed that the interaction between day-level perceived autonomy support and autonomy orientation on day-level meaningful work was significant (M3, b = -0.045, p = .008), with the explained variance increasing by 2.2% by adding the interaction term. Simple slope analyses (Fig. 2) showed that day-level perceived autonomy support was related to meaningful work (b = 0.115, p = .009) at low (-1 SD) levels of autonomy orientation, but was unrelated to meaningful work (b=0.070, p=.090) at high (+1 SD) levels of autonomy orientation. Hypothesis 5 was thus not supported. However, supporting Hypothesis 6, the interaction between day-level perceived prosocial impact and prosocial orientation on day-level meaningful work was significant (M4, b=0.076, p=.025), with the explained variance increasing by 3.6% when the interaction term was included. Simple slope analyses (Fig. 3) showed that day-level perceived prosocial impact was significantly related to day-level meaningful work at all levels of prosocial orientation, with a stronger association at high (+1 SD) levels of prosocial orientation (b=0.357, p<.001) compared with low levels (b=0.281, p=.001).

Finally, we further tested the moderated mediation model using a Monte Carlo simulation with 10,000 replications to construct confidence intervals around the estimates (Bauer et al., 2006) and compared the indirect relationship between day-level perceived autonomy support/day-level perceived prosocial impact and day-level work engagement via daylevel meaningful work at high (+1 SD) and low (-1 SD) levels of autonomy orientation/prosocial orientation. The results (in Table 4) demonstrated that the indirect relationship between day-level perceived autonomy support and day-level work engagement via day-level meaningful work was significant at low (indirect effect=0.162, 95%CI [0.026, 0.298]) but not high (indirect effect = 0.067, 95%CI [-0.011, 0.145]) levels of autonomy orientation, and the difference between the high- and low-level indirect effects was significant (Δ = -0.095, 95%CI [-0.180, -0.010]). Likewise, the indirect relationship between day-level perceived prosocial impact and day-level work engagement via daylevel meaningful work was more significant at high (indirect effect = 0.363, 95%CI [0.121, 0.605]) than low (indirect





Table 4 Moderated Mediation Results

Moderator	Level	Condi-	Boot	95%
		tional	SE	Confidence
		Indirect		Intervals
		Effect		
Path: Day-level per	ceived autonor	my support	\rightarrow Day-	level meaning-
ful work \rightarrow Day-lev	vel work engag	gement		
Autonomy	High (+SD)	0.067	0.040	[-0.011,
orientation				0.145]
	Low (-SD)	0.162	0.037	[0.026, 0.298]
	Diff1	-0.095	0.036	[-0.180,
				-0.010]
Path: Day-level per	ceived prosoci	ial impact –	→ Day-le	vel meaning-
ful work \rightarrow Day-lev	vel work engag	gement		
Prosocial	High (+SD)	0.363	0.065	[0.121, 0.605]
orientation	Low (-SD)	0.199	0.046	[0.020, 0.378]
	Diff3	0.165	0.073	[0.035, 0.295]

effect=0.199, 95%CI [0.020, 0.378]) levels of prosocial orientation, and the difference between high- and low-level indirect effects was significant (Δ =0.165, 95%CI [0.035, 0.295]). Hypothesis 7 and 8 were thus supported.

Additional analyses

We conducted supplementary analyses to examine the robustness of our findings. Considering the busy and concentrated nature of the participants' daily work, they were asked to fill in the questionnaire including measurements of all variables at a given time point each day, which brings about potential conceptual and statistical issues with the testing of directional relations. Based on the approach adopted in a few recent studies (e.g., Chong et al., 2020; Liao et al., 2021; Liu et al., 2022), incorporating time lags in data analyses can alleviate the potential concern for common method

bias to some extent (Podsakoff et al., 2003). Therefore, in supplementary analyses we examined the impacts of daylevel autonomy support, and prosocial impact, on daylevel meaningful work t+1 and day-level work engagement $_{t+2}$. The results indicated that day-level autonomy support , was positively related to day-level meaningful work to the test of t after controlling for day-level meaningful work , (b=0.170,p < .001). Day-level prosocial impact , was also positively related to day-level meaningful work $_{t+1}$ after controlling for day-level meaningful work , (b=0.180, p<.001). Meanwhile, day-level meaningful work, was positively related to day-level work engagement $_{t+1}$, after controlling for daylevel work engagement $_{t}$ (b=0.208, p<.001). The interaction between day-level autonomy support $_{t}$ and autonomy orientation, on day-level meaningful work t+1 approached significance (b = -0.048, p = .003), so was the interaction between day-level perceived prosocial impact, and prosocial orientation on day-level meaningful $_{t+1}$ work (b = 0.075, p = .001). These results provide additional support for our research findings.

Discussion

The goal of this research is to examine whether autonomy support and prosocial impact are different sources of meaningful work in organizational settings, which further influence employee work engagement, and to explore the boundary conditions of individual orientations among these relationships. Through a two-phase daily diary study with the nursing sample, we found that on days when individuals perceive greater autonomy support and prosocial impact, they are more likely to experience meaningful work, confirming that these two factors are important sources of meaningful work. In addition, day-level meaningful work mediates the positive relationships between day-level perceived autonomy support/prosocial impact and day-level work engagement. This study also revealed that individual orientations serve as moderators. As expected, the positive relationship between day-level perceived prosocial impact and day-level meaningful work is stronger in highly prosocial-oriented employees. However, the positive relationship between day-level perceived autonomy support and meaningful work is weaker for employees with higher autonomy orientation. These findings have both theoretical and practical implications, which are discussed below.

Theoretical implications

Sources of meaningful work

By examining relationships among focal variables, this study makes contributions to extant literatures on meaningful work. When it comes to leader autonomy support, a large body of research has confirmed its importance in promoting employees' positive work behaviors (Slemp et al., 2018), work performance and well-beings (Deci et al., 2001; Schultz et al., 2015; Williams et al., 2014). Our findings suggested that, such autonomy supportive leadership style not only facilitates employees' positive work behaviors, but also improves employees' perception of work meaningfulness, adding one piece of empirical evidence for linking organizational managerial practices to employees' perceived work meaningfulness (Michaelson et al., 2014). It is likely that meaningful work is the very mechanism through which autonomy support gives rise to positive work behaviors. However, direct testing of this assumption in future studies is warranted. In addition, evidence across cultures (Schwartz & Bardi, 2001; Allan et al., 2017), jobs and industries supports prosocial impact as another source of meaningfulness (Colby et al., 2001; Ruiz-Quintanilla & England, 1996). Our findings thus provide additional empirical evidence for the positive effect of having a prosocial impact on one's work experience (Grant, 2007; Michaelson et al., 2014). All in all, we confirmed that autonomy support and prosocial impact are two separate and different sources of meaningful work, responding to Bailey et al. (2019)' suggestion that employees are more likely to experience meaningfulness when having access to diverse sources of meaningfulness rather than simply one (Rosso et al., 2010; Schnell et al., 2013) and echoing calls for research which examines multiple sources of meaningful work simultaneously (Bailey et al., 2019; Martela et al., 2021; Rosso et al., 2010).

The dynamic nature of meaningful work

The dynamic nature of meaningful work is taken into full consideration in this study. Previous research primarily adopted the traditional static perspective and distributed cross-sectional surveys to investigate the antecedents and outcomes of meaningful work, ignoring the fact that individual perceptions of meaningful work can vary on a daily basis (Bailey et al., 2017; Bailey & Madden, 2017). Meaningful work does not reflect a constant psychological state; rather, for many employees, work may have fluctuating levels of meaningfulness which may be related to specific experiences in their social interactions with others (Bailey et al., 2019). For instance, a person may perceive higher meaningful work on a workday when his/her work benefits a colleague or a client than on a workday when his/her work does not benefit others. Work engagement, similarly, is a psychological state that can change over time rather than a relatively stable personal trait (Kahn, 1990). In organizational behavior studies, the daily diary method is burgeoning which rapidly grows in popularity, in which scholars use repeated measures to obtain the lived, day-to-day experience of employees, minimizing retrospective biases that plague single time point, between-person assessments (Beal, 2015). Scholars have increasingly adopted them to explore research topics related to intra-individual, dynamic phenomena (Gabriel et al., 2019).

In this study, the daily diary design is instrumental for research on the antecedents of the individual experience of meaningful work as it brings the level of analysis closer to the catalysts of daily behaviors. Our findings show that 23–31% of the variances in our constructs reside in the within-person level, which is comparable to the percentage of withinperson variations typically reported in previous literatures as summarized in McCormick et al.' (2020) meta-analysis. In particular, our findings confirmed the daily variation of meaningful work, which is important since it suggests that future studies should extend beyond the between-person focus to account for within-person variations in meaningful work across time. Moreover, our findings respond to recent scholars' call to pay more attention to the dynamic nature of work behaviors by using the daily diary or experience sampling method (ESM) based on the rapidly developing communication technology (Bailey et al., 2017).

Interactions of individual and environmental factors on meaningful work

This study aims to build a more comprehensive understanding of meaningful work by examining the joint influence of personal and environmental factors on meaningful work and to understand how they interact with each other (Kristof-Brown et al., 2005; Lysova et al., 2019). While the positive moderating role of prosocial orientation was confirmed, we found that the positive relationship between daylevel perceived autonomy support and day-level meaningful work is actually weaker for employees with higher autonomy orientation. Although evidence from varied domains (e.g., education, athletics, and health care) consistently confirmed that both autonomy support and autonomy orientation facilitate positive motivational outcomes (Gagné, 2003; Gagné & Deci, 2005), to date how their interactions would affect individual outcomes has gained mixed results (Liu & Fu, 2011; Liu et al., 2011). For instance, in a pioneering study published on a top-tier journal, it was reported that team members with lower autonomy orientation benefitted more from team autonomy support and their harmonious passion increased to a greater extent compared with those with higher autonomy orientation (Liu et al., 2011). The researchers resorted to the compensating effect of contextual factors for individual dispositions to explain such counterintuitive findings. According to SDT (Deci & Ryan, 1985), autonomy-oriented ones would try to follow their hearts and perform self-determined behaviors, and tend to display higher autonomous motivation in any activity (Hagger & Chatzisarantis, 2011) rather than passively depending on external context. Consequently, they do not need as much autonomy support from the work context when developing meaningful work perceptions compared with those of lower autonomy orientation.

It is worth noting that, while empirical results supporting the person-environment fit hypothesis and the compensating hypothesis were both reported, researchers did not bring the conflicting findings together and try to give a reasonable explanation (Gagné & Deci, 2005; Liu & Fu, 2011; Liu et al., 2011). Thus, it remained unclear why one pattern was observed in a sample, while an opposite pattern was observed in another sample. After repeated deliberation, we consider that the inherent limitation of GCOS is a possible reason. While GCOS is the most authoritative scale that measures one's autonomy orientation through well-developed vignettes, it failed to distinguish between assisted autonomy and asserted autonomy, the two types of autonomy orientation. Legault et al. (2017) claimed that satisfaction of the need for autonomy can be both contextually assisted and individually asserted. That is, one may satisfy autonomy need through one's experience with autonomy-supportive contexts and relationships (i.e., assisted autonomy), or proactively pursuing it on their own in spite of low contextual support (i.e., asserted autonomy). They then developed and validated new scales, and found that satisfaction of both forms of autonomy positively correlated with the autonomy orientation measured by GCOS. It is a pity that the authors did not develop an autonomy orientation scale which further distinguishes between assisted autonomy orientation and asserted autonomy orientation, which could help resolve the conflicting findings in terms of the interaction between autonomy orientation and autonomy support.

The fact that nurses were chosen as our research sample may help explain the counter-intuitive finding of the interaction between autonomy orientation and autonomy support as well. Since this occupation required them to follow strict medical procedures at work, it is likely that they have developed an asserted autonomy-satisfying style. Legault et al. (2017)'s study suggested that the development of an asserted autonomy-satisfying style may reveal a capacity for psychological resilience in face of need-thwarting conditions. Thus, nurses can actively satisfy their own autonomy by promoting a more assertive form of autonomy functioning in spite of low contextual autonomy support. In this study, nurses reported themselves to have relatively high autonomy orientation. If this autonomy orientation is asserted in nature, then they do not need as much autonomy support from the surroundings compared to those with lower autonomy orientation when developing meaningful work perceptions, which explains why autonomy orientation negatively moderates the positive relationship between perceived autonomy support and meaningful work. Therefore, future research distinguishing asserted versus assisted autonomy orientations and further exploring how the interaction between one's autonomy orientation and perceived autonomy support affects the focal outcomes is warranted.

To conclude, this study highlights how work meaningfulness is perceived by different employees working in the same work context (Lysova et al., 2019). Although scholars from varied disciplines have endeavored to examine how individual, job, organizational, and societal factors contribute to meaningful work, an integrative theoretical framework that explains how factors of different levels relate to one another in producing meaningful work is missing (e.g., Barrick et al., 2013; Lysova et al., 2019; Rosso et al., 2010). Our research, which investigates how autonomy support/ prosocial impact interact with individuals' orientations to influence meaningful work, empirically contributes to understanding of the framework in development.

Practical implications

Having insights into the factors that shape meaningful work help managerial practitioners understand how organizations can boost meaningful work among their employees so as to facilitate positive work, career, and well-being outcomes for them (Lysova et al., 2019). This study confirmed that autonomy support and prosocial impact, the work situations individuals may experience at work, are separate sources of meaningful work. This finding is of special value to employees, supervisors, and HR professionals whose responsibilities include better managing human resources.

Since not all employees are self-regulated or prosocialmotivated, organizations have the responsibility to provide opportunities for employees to experience meaningful work, especially for those who might find it hard to do so on their own (Lysova et al., 2019). On the one hand, leaders play a crucial role in facilitating one's experience of meaningful work and should be the corner piece of a meaningfulness management strategy. HR professionals should consider training supervisors to foster an autonomy-supportive work climate so as to improve employees' perception of meaningful work. Training interventions focusing on the development of autonomy support were found to be effective in organizations (e.g., Beenen et al., 2017; Pichler et al., 2014; Su & Reeve, 2011; Yong et al., 2019) if their planning, implementation and evaluation are carefully considered (Slemp et al., 2021). For instance, beneficial approaches to pedagogy, such as self-reflections and one-on-one consultations, provide a collection of techniques to support the motivation for behavioral changes (Slemp et al., 2021). In addition, HR professionals are suggested to organize training or mentoring programs which instruct employees to consciously perceive the subtle while meaningful changes their actions are making to the world, thus increasing their perceived prosocial impact (Lin & Meng, 2022). In addition, supervisors can help employees enhance their perceptions of prosocial impact by acknowledging their contributions to others' well-being and providing direct feedback from the beneficiaries. When employees are too busy to be aware of their own prosocial behaviors in daily work, direct feedback is extremely helpful in enhancing their perceptions of prosocial impact, thus enhancing their experience of meaningful work.

Moreover, taking personal orientations into account, this study largely advances existing research on meaningful work (e.g., Bailey et al., 2017; Pratt & Ashforth, 2003) by arguing that organizations need to account for individual differences nested within the social contexts in their attempts to facilitate meaningful work. Knowing how personal and environmental factors interact with each other to foster meaningful work, organizations can better customize their organizational practices and the design of their jobs (Lysova et al., 2019). Highly autonomy-oriented employees may proactively pursue meaningful work on their own in spite of low contextual support. Training or mentoring interventions should thus focus on guiding them to make better use of their abundant psychological resources in dealing with potentially need-thwarting conditions.

Research Limitations and future directions

This study is not without limitations, which warrants several lines of future research. First, the fact that we recruited nurses as our research participants may raise concerns. While we consider them to be the appropriate sample, one may question the generalizability of our findings. Future research may test whether autonomy support and prosocial impact can boost individual experience of meaningful work in other occupations, settings and/or cultures as well. If research budgets or conditions allow, collecting a larger sample is expected to improve the statistical power of the research findings.

Second, more rigorous research design should be adopted in future research when examining the dynamics of meaningful work. For example, attention checks should be included in the questionnaire to ensure the quality of the participants' responses. Besides daily diary, the more rigorous method of ESM can be adopted to repeatedly examine one's psychological status and behaviors in their daily work lives and has its advantages. In daily diary studies, questionnaires are distributed once each day, which often takes place at the end of the day. In ESM studies, questionaries are generally distributed multiple times per day (e.g., every three hours or on several random time points per day) or are even based on the occurrence of events, which are beneficial for the obtaining of accurate information on the momentary experience (Horstmann, 2021). Of course, detailed ESM setup checks (e.g., have control over the relevant situational variables when participants respond to the survey and analyze them as covariates in data analyses) should be carefully considered. Third and relatedly, since our findings preliminarily confirmed the daily variation of meaningful work, more elaborate data analyses based on the longitudinal dataset collected by ESM should be conducted in future research. For instance, cross-lagged panel modeling or latent growth modeling (Selig & Preacher, 2009) can be used to learn about the variation trend of the focal variables (e.g., meaningful work) across consecutive days as well as to examine the causal relationships between the focal variables.

Fourth, as was discussed beforehand, in future studies researchers are expected to develop scales that distinguish between asserted versus assisted autonomy orientation based on the existing GCOS and Legault et al. (2017)'s autonomy satisfaction scales and then examine their respective interactions with autonomy support. We expect this to be a fruitful avenue of future research.

Finally, there is some evidence that the prevalence of stress-related disorders among nurses and health care workers are higher than ever before upon the COVID-19 (Chen et al., 2021), and several studies reported the prevalence of

post-traumatic stress disorder which drives many nurses out of the profession and necessitates an extraordinary recovery effort (Yuan et al., 2021). Our unpublished dataset collected during the outbreak of pandemic found prosocial impact to be a source of meaningful work, but not autonomy support. Whether the positive relationships between perceived autonomy support/prosocial impact and meaningful work still hold true in the post-pandemic era invites future research. As suggested by one of the reviewers, the two sources of meaningful work may play different roles under the new normal.

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