



# Does Strengths Use Mean Better Focus? Well-being and Attentional Performance at the Episodic Level

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## Abstract

Positive psychology postulates that using one's strengths can facilitate employee well-being and performance at work. However, whether strengths use is associated with attentional performance has remained unanswered in the literature. Attention plays a role in job performance, and previous literature has suggested a contrasting link between well-being (i.e., positive affect) and attentional performance. We hypothesize that, within work episodes, strength use is positively associated with eudaimonic (i.e., meaningfulness and personal growth) and hedonic well-being (i.e., positive affect). Further, we test the episodic process model by arguing that strengths use and well-being during one work episode are negatively related to subsequent attentional performance. In total, 115 participants registered for the current study, and 86 participants filled out the daily questionnaire once per day across five working days (a total of 365 daily reports). Multilevel analyses showed that episodic strengths use was not directly related to subsequent attentional performance. Episodic strengths use was positively related to a higher level of meaningfulness, personal growth, and positive affect. In turn, experienced meaningfulness was negatively related to subsequent attentional performance. However, personal growth and positive affect did not explain variance in attentional performance. These findings suggest that strength use may be accompanied with higher experienced meaningfulness, although the latter may be detrimental for subsequent attentional performance. Theoretical implications and contributions are discussed.

**Keywords** Strengths use · Attentional performance · Eudaimonic well-being · Hedonic well-being · Episodic process model

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## 1 Introduction

The recent literature on occupational health increasingly focuses on fluctuations in behavior, affect, and cognition across different work episodes, days, or weeks (Gabriel et al., 2019). Such fluctuations are assumed to be relevant in terms of employee well-being and performance. For example, within a workday, some tasks may be associated with a strong sense of engagement and accomplishment, whereas other tasks may be less interesting and associated with fatigue and frustration (Beal et al., 2005). The central aim of the current study is to examine whether a positive approach of occupational health (Bakker & Van Woerkom, 2018)—strengths use—may contribute to episodic fluctuations in employees' well-being, and their subsequent attentional performance.

Strengths are defined as strong points or skills that allow a person to perform at their best (Miglianico et al., 2020). For example, an employee who has strong social skills may excel when interacting with customers. Studies have shown that strengths use behavior may fluctuate across different weeks and different days, and is predictive of affective, cognitive, and motivational states (Bakker et al., 2019; Van Woerkom & Meyers, 2019; Van Woerkom et al., 2016). In line with this, the current study employed the within-person level approach (Beal et al., 2005) to assess whether episodic fluctuations in strength use are associated with episodic changes in eudemonic versus hedonic well-being and attentional performance. As attention is known to be a crucial factor in influencing job performance (de Sampaio Barros et al., 2018; Van der Linden et al., 2003), it is relevant to understand how strengths use is related to it, which has been largely neglected in the strengths-use literature (Bakker & Van Woerkom, 2018).

In the current study, we aim to make the following contributions. First, we extend the literature regarding the *objective* outcomes of strengths use. Previous studies have shown that attention-related performance is sensitive to well-being, including positive affect (Ashby et al., 2002; Rowe et al., 2007) and engagement (Newton et al., 2020). However, prior studies in this field have primarily focused on self- and other-ratings of performance (de Sampaio Barros et al., 2018). In the present study, we not only ask participants to report their feelings or experiences when using their strengths, but also used a computerized task (Stroop Color and Word Test) (Golden & Freshwater, 2002) to directly test employee attentional performance after the episode in which employees may or may not have used their strengths.

Second, one classification of well-being receiving increasing scholarly attention is eudaimonic versus hedonic well-being (Ryan et al., 2008). Eudaimonic well-being refers to the fulfillment of one's goal and is associated with feelings of meaningfulness, purpose, and personal growth (Nagel, 1972). In contrast, hedonic well-being points to maximizing positive affect or pleasure and minimizing negative affect (Turban & Yan, 2016). Strengths use has been shown to increase well-being and performance (Bakker et al., 2019; Van Woerkom & Meyers, 2019; Van Woerkom et al., 2016; Wood et al., 2011), but the knowledge on which of these two aspects of well-being possibly mediates the potential association between strength use and attentional performance is relevant but largely unknown. We contribute to the strengths use and performance literature by taking into account eudaimonic and hedonic well-being as potential mediators.

Third, we indirectly tested the episodic process model (Beal et al., 2005) by using a micro-level approach to associate strengths use with attentional performance at the within-person level. This episodic-level design may provide a greater understanding of the more proximal relationships between strengths use, well-being, and attentional performance,

which expands previous literatures that predominantly focused on the longer-term associations (e.g., weekly level, daily level) or cross-sectional relationships (de Sampaio Barros et al., 2018; Phillips et al., 2002; Rowe et al., 2007). Yet, the present within-person approach that includes objective attentional performance measures provides information on more micro-level dynamics of positive and negative correlates of strength use.

## 2 Theoretical Background

### 2.1 Strengths Use

Strength use refers to the expressiveness and application of characteristics or skills that allow a person to function at their best (Miglianico et al., 2020). Strengths have trait-like properties (e.g., humor, emotional intelligence, creativity), but the use of strengths varies across different weeks, days, or episodes, depending on the context (Peterson & Seligman, 2004). Strengths use may increase self-efficacy because using core qualities enables individuals to cope well with task challenges. When skills or strengths match situational challenges, people are more likely to be engaged in their work and totally focus on the task at hand. According to the literature, a skill-challenge balance is positively related to performance (Engeser & Rheinberg, 2008).

Previous studies have shown that strengths use is positively associated with self- and other-rated job performance (Bakker & Van Woerkom, 2018; Dubreuil et al., 2014; Van Woerkom et al., 2016), because when people conduct tasks using their strengths, they are more likely to be confident and authentic (Bakker & Van Woerkom, 2017). Following a naval sample for 30 days, Bakker et al. (2019) discovered that on the days when crew members used their strengths, they reported a higher level of engagement and produced more positive affect. In the current study, as we assessed the employees' attentional performance immediately after a work episode in which they used their strengths (or not), this within-person approach is different from the majority of previous studies focusing on longer-term (e.g., weekly level, daily level) or cross-sectional relationships (cf. Miglianico et al., 2020).

Particularly relevant to the present study is the work of Dubreuil et al. (2014), who found that strength use was positively related to performance, mediated by passion and concentration, which suggests a possible relationship between strength use and attentional performance. However, in the study of Dubreuil et al. (2014), concentration was only measured using subjective self-reports. Thus, an essential point is that it remains unclear whether the findings of Dubreuil et al. (2014) should be considered as evidence for a substantial attentional performance associated with strength use, or whether it is that their findings are mainly due to the subjective interpretation of the participants' attentional performance.

In addition to Dubreuil et al.'s (2014) findings, there are other reasons to expect that, under some circumstances, attentional performance may decrease after strength use. Using strengths may improve one's mood and job performance (Littman-Ovadia et al., 2017; Wood et al., 2011). Although a large body of literature supports that positive mood increases cognitive flexibility, such as problem solving and creativity (Amabile et al., 2005; Fredrickson, 2001), there is growing evidence suggesting that positive affect can also have unfavorable effects on attentional performance (Oaksford et al., 1996; Phillips et al., 2002; Rowe et al., 2007). Given such contradictory findings, it is imperative to directly test the association between strength use and objective attentional performance, which, to the best of our knowledge, has been rarely studied before.

## 2.2 Attentional Performance

Attention is a critical cognitive resource related to task focus which links to work performance (Gardner et al., 2011). Each job task calls for a certain degree of attention given that employees have to cope with (cognitive) challenges. Attention has a transient nature since individuals tend to feel tired or bored if they have paid attention to a specific task for a prolonged period (Van der Linden et al., 2003). In addition, to the effects of fatigue, attention residue may occur (Leroy, 2009). Specifically, when employees enter a specific work episode, they may still reflect on activities they carried out during a previous work episode, implying that there will be fewer attentional resources available for their current work activities. Attention residue is a type of ruminative thought that is “specific to the context of task transitioning and the issue of allocating attention among activities; specifically, it describes thoughts that relate to a prior task when working on a subsequent task” (Leroy, 2009).

Indeed, previous research has provided evidence on attention residue effects. Leroy (2009) found that participants showed poorer performance if the previous task was unfinished. Yet, even the tasks that had been completed still consumed some level of attentional resources. Similarly, in the survey and experimental studies among employees and students, Newton et al. (2020) found that engagement in a specific task was positively associated with employees’ motivation; in turn, task engagement was, however, also associated with attention residue, which impaired engagement and performance on subsequent tasks.

As a follow-up study of Leroy’s (2009) and Newton et al.’s (2020) research, we rely on a computerized task, namely the Stroop Color and Word Test (Golden & Freshwater, 2002), to assess attentional performance objectively. Specifically, immediately after a specific work period in which employees report their strengths use, they are required to conduct the Stroop test. This enables us to observe whether employees show enhanced or compromised performance after a work episode. Since both strengths use and attentional performance share episodic and fluctuating attributes, we apply the episodic process model (Beal et al., 2005) on which we elaborate below.

## 2.3 Episodic Process Model

Beal et al.’s (2005) episodic process model refers to work as a sequential process consisting of a series of work episodes. In the model, work episodes can interact with one another and influence performance. A *performance episode* is referred to as a time-bound, task-related period, and employees’ performance is proposed to vary across performance episodes depending on task characteristics and individual states. For example, positive or negative affect may accumulate during one episode and have an impact on performance in and outside specific episodes. Beal et al., (2005, p. 1055) also noted, “As they (employees) move from one activity to another, some episodes may remain active or open, in the sense that although they do not hold a person’s momentary attention, that individual does not subjectively feel that they have decided to terminate the episode.” This may partly relate to attention residue.

When people use their strengths during specific episodes, they tend to be engaged and experience a stronger sense of reward and meaningfulness (Van Woerkom & Meyers, 2019; Van Woerkom et al., 2016). There are several reasons to expect, however, that attentional performance on subsequent tasks/episodes may decline after using their

strengths. According to the attention residue notion, people may find it difficult to completely disengage after strengths use because strengths strongly facilitate work engagement (Van Woerkom et al., 2016). At the same time, since tasks in which employees use their strengths may require relatively high levels of attention and consume energetic and cognitive resources (Bakker & Van Wingerden, 2020; Liu et al., 2021), less of their attentional resources may be available at hand, which may relate to a reduced focus and suboptimal performance on subsequent tasks (Leroy, 2009; Newton et al., 2020).

A second possible reason why attentional performance may be compromised after strength use is its effects on mood. Doing what one is good at is associated with more positive affect (Dubreuil et al., 2014). Therefore, during the episodes when using strengths, people might accumulate positive affect. However, a large body of literature shows that positive mood is associated with longer response time in attention-related tasks (Gable & Harmon-Jones, 2008; Phillips et al., 2002; Rowe et al., 2007). The general argumentation for the negative effect of mood on attention is that positive mood increases the attentional scope, allowing individuals to be potentially distracted by irrelevant information. Hence, after a period in which one has used strengths, the accompanying positive mood may be associated with worse attentional performance.

Even though little empirical evidence has been accumulated regarding a negative association between strengths use and attentional performance, there are several similar proactive behaviors or states that have been shown to have a negative relationship with performance. For example, Bakker and Oerlemans (2019) showed that job crafting (another form of proactive behavior) is positively related to momentary ego depletion, which, in turn, negatively related to work engagement. Similarly, Cangiano et al. (2021) found that taking charge behavior (another form of proactivity) is negatively related to detachment in the evening, which impairs next-day motivation and performance. Some scholars have also argued that only proper use (e.g., strengths-situation match) of strengths generates beneficial effects, and that overuse of strengths or using strengths in inappropriate situations will produce adverse effects (Bakker & Van Woerkom, 2018).

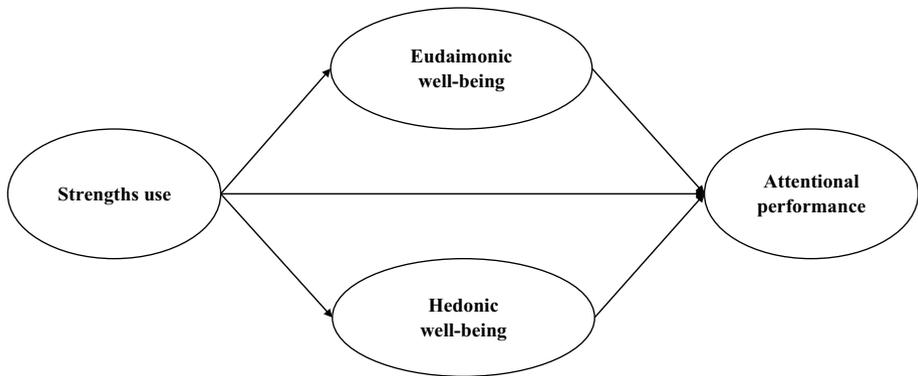
All in all, as the literature regarding lowered attentional performance after task engagement and positive mood is more prevalent, we formulate the following hypothesis:

**Hypothesis 1** Strength use in a specific episode is *negatively* related to subsequent attentional performance.

## 2.4 The Mediating Role of Eudaimonic and Hedonic Well-being

Given the above argumentation that attention residue or mood state links to attentional performance, one possible factor that may mediate the relationship between strength use and attentional performance is well-being, including eudaimonic and hedonic well-being (see Fig. 1; Turban & Yan, 2016).

A comprehensive classification of well-being distinguishes eudaimonia from hedonia and refers to them as two essential aspects of well-being (Straume & Vittersø, 2012). Eudaimonia and hedonia originate from different philosophical roots. Eudaimonia stems from Aristotle, who emphasized the moral and virtue aspects guiding life (Nagel, 1972). Eudaimonia theory refers to that well-being is primarily derived from realizing one's potential by allowing a person to become fully functioning (Rogers, 1963) and argues that well-being is characterized by meaningfulness and personal growth (Turban & Yan, 2016). Here, meaningfulness refers to developing a sense of purpose or significance when doing



**Fig. 1** Proposed Model of Strengths Use, Well-being, and Attentional Performance at An Episodic Level

things worthwhile (Martela et al., 2018); whereas personal growth refers to how employees consider their sense of learning, progress, and development (Luyckx & Robitschek, 2014).

Hedonia is also rooted in ancient Greece (Henderson et al., 2013). According to the Greek philosopher Aristippus, hedonia is generated from satisfying appetites versus suppressing them, and people may lead a happier life if they can fulfill their desire or lust. In contrast to eudaimonia, hedonia is more concerned with the happiness produced by consumption and sensuous gratification (i.e., spending money, watching movies, eating delicious food). A happier mood, however, does not necessarily indicate that a person has done something meaningful. In the work context, taking a short walk during work breaks or playing a game with colleagues (e.g., Ping Pong) is considered to increase hedonic well-being as it allows employees to relax and refresh. Compared to eudaimonia, hedonic well-being is characterized by positive affect, relaxation, vitality, and less negative affect and stress (Henderson et al., 2013). Though there are different measurements of hedonia, following Bassi et al. (2014), we mainly refer to positive and negative affect (PANAS; Watson et al., 1988) as indicators of hedonic well-being.

When employees use their strengths (e.g., a creative person designs a new proposal for research), they are likely to be more authentic, allowing them to become more self-confident because they are doing what they are good at (Van Woerkom et al., 2016). Employees will also flourish as they can better deal with challenges and difficulties encountered at work when using strengths (Littman-Ovadia et al., 2017). Strengths use may also help satisfy basic psychological needs (i.e., relatedness, Bakker & Van Woerkom, 2017), because strengths use increases positive mood, and people tend to be more prosocial and offer help when they are happy (George, 1991).

In a recent review, Ghielen et al. (2018) synthesized 18 (quasi-)experimental studies and confirmed that strengths-based interventions enhance well-being, work engagement, and personal growth initiative. Overall, these findings indicate that when people use their strengths, they are more likely to experience eudaimonia. From a hedonic perspective, when performing tasks or activities one excels in, employees develop feelings of control over their tasks and associated positive affect (Wood et al., 2011). In line with the reasoning above, we propose the following hypotheses:

**Hypothesis 2a** Strength use is positively related to eudaimonic well-being in terms of meaningfulness and personal growth.

**Hypothesis 2b** Strengths use is positively related to hedonic well-being in terms of more positive affect and less negative affect.

Since strengths use tends to produce a higher sense of eudaimonia, it might make it more difficult to transfer their attention from the previous to subsequent tasks (see Fig. 1). Because meaningful tasks draw employees' attention, they may be less willing to change their focus if the subsequent tasks are not attractive or interesting enough (Newton et al., 2020). In other words, better well-being during one work episode might bring attention residue to the next episode, which may compromise performance in the next episode. Imagine a researcher totally focusing on writing a paper. If a colleague visits to invite them to join in a Ping Pong game for a short break suddenly, then the researcher might not perform optimally during the game as they may still ruminate on various ideas.

Moreover, although strengths use is accompanied by positive affect, which coincides with a broader attentional scope (i.e., enables a person to process more information except for the core of task), strengths use and the accompanying positive affect may become detrimental to attentional performance when there are multiple tasks ongoing and the performed task requires a high concentration level. A broader attentional scope, for example, may imply that a person is more frequently distracted by task-irrelevant stimuli (Rowe et al., 2007). The distraction may allow individuals to be unable to fully focus well on the tasks at hand (Lavie, 2010). In the work context, as the work process involves multiple tasks (e.g., meeting, writing, management), which requires considerable cognitive efforts, people may be distracted by stimuli from other tasks when they are in a good mood. Especially when people transit their attention across work episodes, such as from task to task, it is more likely that people feel an excessive cognitive load as there is information emerging from both the previous and current tasks.

Indeed, several studies have provided preliminary evidence for the negative link between positive affect and attentional performance. For instance, Phillips et al. (2002) found that positive mood did not change general reaction times in a traditional Stroop task, but caused longer reaction time when switching conditions during the task (i.e., take turns to respond to the ink of color and the word itself). Similarly, Oaksford et al. (1996) showed that both positive and negative affect suppressed performance in a selection task and replicated the detrimental effect of positive mood on the performance in Tower of London task.

In total, since meaningfulness (eudaimonia) accompanied by strengths use may let individuals keep immersed in what they are performing, which may account for why attention residue appears, we argue that eudaimonic well-being will mediate the negative relationship between strengths use and attentional performance. In addition, based on the side-effect of mood on attention (Rowe et al., 2007), which allows individual to be attracted by distractors, we propose that at the within-person (episodic) level, hedonic well-being will also mediate the association between strengths use and attentional performance.

**Hypothesis 3a** Strength use is negatively related to subsequent attentional performance through eudaimonic well-being.

**Hypothesis 3b** Strengths use is negatively related to the subsequent attentional performance through hedonic well-being.

**Table 1** Within and Between-Person Reliabilities of the Measures

	Cronbach's $\alpha$ within-person	Cronbach's $\alpha$ between-person
Strengths use	.85	.98
Meaningfulness	.88	.98
Personal growth	.84	.99
Positive affect	.79	.97
Negative affect	.74	.97

### 3 Method

#### 3.1 Participants and Procedure

Participants were employees in various organizations in China and who were recruited via WeChat (i.e., a social media application). We distributed the invitation links in several WeChat groups, and people who received these links could volunteer to participate in the current study. They were enrolled in our survey after filling out a baseline questionnaire, which asked about their informed consent and demographics. Following the baseline questionnaire, participants received a daily (episodic level) survey across five consecutive working days (Monday to Friday). They were asked to complete the daily questionnaire between 3:00 pm and the end of their work. Specifically, they first answered questions regarding their strength use in the previous hour and their current mood states, and then conducted the attentional performance (Stroop) task. The visual stimuli were displayed randomly but the basic form of Stroop task was kept unchanged (e.g., rounds) across individuals and episodes. As such, an experience sampling method (Gabriel et al., 2019) was employed. Each participant was compensated with 25 RMB (3.23 Euros).

In total, 115 participants (75.4% women) registered successfully in the baseline questionnaire. Following the baseline questionnaire, 86 participants (75.6% female) completed the daily questionnaire, resulting in 365 measurement occasions. The average age was 28.66 ( $SD = 5.86$ ), and 36.8% were married or engaged. The vast majority of participants had completed university or college education (99.1%). The average amount of working experience was 4.87 years ( $SD = 5.83$ ). The mean of actual working hours was 8.27 ( $SD = 1.90$ ) per day compared to the job contract requirement of 7.89 ( $SD = 0.98$ ) hours per day. Participants were from various occupational backgrounds, including Education and Training (23.7%), Government and Public Administration (11.4%), Science, Technology, Engineering and Mathematics (7.9%), and Manufacturing (7.0%).

### 4 Measures

All the questions were translated and back-translated before being administered to participants (Brislin, 1970). The authors added “during the last one hour” to the beginning of each episodic-level measure. All the items in the episodic questionnaires were rated on a seven-point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

All of our study measures have good reliability at the within-person and between-person level (Cronbach's  $\alpha$ , see Table 1).

#### 4.1 Episodic-level Strength Use

Strength use was assessed using adapted items from a daily diary study on strength use (Bakker et al., 2019). They used four items to measure strengths use at work. The average within-level reliability coefficient Cronbach's  $\alpha$  was 0.89 in the original scale (Bakker et al., 2019). In the current study, we converted their weekly questionnaire into daily version. Two example questions are: "During the last one hour, I used my talents at work," and "During the last one hour, I have benefited in my work from my strengths." The scores on the items were averaged, and higher scores implied more use of strengths.

#### 4.2 Episodic-level Eudaimonia

Eudaimonia has various conceptualizations and is often characterized by personal growth and meaningfulness (Turban & Yan, 2016). Six items from Psychological Meaningfulness Scale (May et al., 2004) were used to measure episodic-level meaningfulness at work. Cronbach's  $\alpha$  in the original scale assessing psychological meaningfulness was 0.90. A sample item is "During the last one hour, the work I did on this job was very important to me." The six items' scores were averaged to calculate meaningfulness.

Three items from Turban and Yan (2016) were used to measure personal growth at work (Cronbach's  $\alpha$  for personal growth in the original scale was 0.90). A sample item is "During the last one hour, I had opportunities to learn and grow at work." The scores on the three items were averaged to calculate personal growth.

#### 4.3 Episodic-level Positive and Negative Affect

We measured hedonia using the PANAS-GEN scale (Watson et al., 1988). Watson et al. (1988) demonstrated internal consistency for the PANAS ranged between 0.86 and 0.90 for positive affect and 0.84–0.87 for negative affect. Positive affect was measured by asking the "enthusiastic, active, and interested" feelings experienced by the participants during the last hour. Negative affect was assessed similarly and referring to the same time span with the emotions "distressed, nervous, and afraid." The average scores of each group of three items was used to calculate positive affect and negative affect, respectively.

#### 4.4 Episodic-level Attentional Performance

The Stroop color test was employed to measure attentional performance (Golden & Freshwater, 2002). A recent review has shown that the Stroop test is a reliable and validated tool to measure attentional performance (Scarpina & Tagini, 2017). In line with the literature, we distinguished between congruent and non-congruent trials: during the congruent trials, participants received word stimuli with the same content and color, whereas in the incongruent trials, the content and color of word were different. It was necessary to distinguish between these two conditions because participants often responded with quicker speed under congruent conditions than under incongruent conditions (Scarpina & Tagini, 2017). During the task, participants were presented

with trials that contained either of the four words, “red,” “black,” “blue,” or “yellow.” The words were written in red, black, blue, or yellow ink. Participants were required to respond as quickly and accurately as possible to the color of the word by pressing one of the buttons (red, black, blue, and yellow) at the middle bottom of the screen. Forty rounds were set for participants. Reaction time (i.e., how fast they react to the word stimuli) was used to measure attentional performance; and the difference in reaction time between congruent trials and incongruent trials was employed to measure the Stroop effect, which indicates the extent to which individuals are able to control over their attentional focus. Using a test–retest method, Franzen et al. (1987) showed Stroop task has good reliability with obtained reliability coefficients ranging from 0.67 to 0.83. Further, we conducted split-half reliability tests (Callender & Osburn, 1977) to measure the consistency of the scores on Stroop test. Specifically, we split the test into halves and correlated the examinees’ scores on attentional performance (i.e., reaction time) on the two halves (i.e., congruent trials vs. incongruent trials). Results showed that participants showed good consistency across the two conditions, Guttman Split-Half Coefficient ranging from 0.75 to 0.90 across the five days ( $M = 0.85$ ).

#### 4.5 Statistical Analysis

Since our data was measured repeatedly during five consecutive working days, the data had a multilevel structure with days nested in persons. We conducted a multilevel confirmatory analysis to examine the factorial validity of the measurements. Following this, a series of multilevel regression and path analyses (for indirect effect) were conducted. As the slopes of the relationships between strengths use and the well-being indicators showed significant variances across subjects (see Supplementary Materials for more details), we ran random slope models to test the hypotheses. The random slope model had a better fit than the fixed slope model as it allowed the within-person regression effects to vary across individuals.

First, we conducted group-mean centering on predictors, including strengths use and well-being indicators (e.g., meaningfulness, positive affect). Then we entered strength use into the regression equation to predict attentional performance. Subsequently, we assessed the within-person effects by regressing meaningfulness, personal growth, positive affect, and negative affect on strengths use simultaneously at the within-person level, which implies that we investigated the daily changes of study variables in a dynamic fashion, rather than seeing them as a one-time event. In a separate model, we entered well-being, including meaningfulness, personal growth, and positive and negative affect, to predict attentional performance. Lastly, we combined strength use, meaningfulness, personal growth, positive affect, negative affect, and attentional performance in one overall model, to test the indirect relationships between strength use and attentional performance using Monte Carlo analysis (Mathieu et al., 2012). Specifically, we entered strength use to predict each of the potential mediators (e.g., meaningfulness, personal growth, and positive and negative) and obtained four coefficients on  $b_1$ . Furthermore, we explained the attentional performance by using all the well-being indicators to calculate coefficients  $b_2$ . Then we multiplied  $b_1$  with  $b_2$  to estimate the indirect effect by following Preacher et al. (2011) procedure. All the analyses were conducted using MLR (maximum likelihood parameter estimates with standard errors) in software Mplus version 7.4 (Muthén & Muthén, 2017).

## 5 Results

### 5.1 Descriptive Statistics

Table 1 showed the means, standard deviations, and correlations between the study variables. To calculate the between-person correlations ( $N=86$ ), we averaged the episodic-level data across the five working days. The within-person correlations were based on each person's daily fluctuations by subtracting the person-mean from all day-level variables ( $N=365$ ). The intra-class correlations (ICC) for each study variable were: Strengths use (0.57), Meaningfulness (0.56), Personal growth (0.57), Negative affect (0.64), Positive affect (0.66), Reaction time in congruent trials (0.59), Reaction time in incongruent trials (0.47), Stroop effect (0.14), suggesting a multilevel method was appropriate. Correlational results showed that, at the within-person level, strengths use was positively correlated with meaningfulness, personal growth, positive affect, but negatively related to negative affect. These findings suggest that strengths use is accompanied by greater well-being, providing preliminary support for our hypotheses. At the same time, higher meaningfulness and negative affect were positively correlated with reaction times in incongruent trials, indicating compromised attentional performance.

### 5.2 Multilevel Confirmatory Analysis

To test the construct validity of our measures, as the study variables had variances at the between-person and within-person levels, we conducted multilevel confirmatory factor analysis (MCFA). The proposed model included five variables: strengths use, meaningfulness, personal growth, positive affect, and negative affect. Results showed that the model comprising five factors at the between-person level and five factors at the within-person level ( $\chi^2(284)=457.08$ ,  $p<0.001$ , RMSEA=0.04, CFI=0.95, TFI=0.94, SRMR<sub>within</sub>=0.05 and SRMR<sub>between</sub>=0.06) displayed a better fit, as compared to all possible four-factor models or models with fewer factors ( $\Delta\chi^2(8)\geq 349.58$ ,  $p\leq 0.001$ ). This means that all five study variables could be empirically distinguished.

### 5.3 Hypotheses Testing

Hypothesis 1 states that strengths use is negatively related to attentional performance. Strengths use was not directly related to attentional performance in congruent trials ( $\beta=0.06$ ,  $SE=0.05$ ,  $p=0.27$ ), and incongruent trials ( $\beta=0.02$ ,  $SE=0.06$ ,  $p=0.77$ ).<sup>1</sup> Therefore, Hypothesis 1 was not supported. Although there were no direct significant relationships between strengths use and attentional performance, it still remains a possibility that there are indirect paths between strength use and attentional performance (cf. MacKinnon et al., 2002; e.g., indirect effect and a direct effect are of opposite direction). Therefore, we proceeded testing Hypothesis 2.

Hypothesis 2 suggests that strengths use is positively related to eudaimonic and hedonic well-being. Results in Table 2 showed that strengths use was indeed positively associated with meaningfulness at work ( $\beta=0.54$ ,  $SE=0.06$ ,  $p<0.001$ ); and positively related to personal

<sup>1</sup> The coefficient was positive because the dependent variable was *reaction times*. Longer response times (slower speed) represent worse attentional performance in the Stroop task.

**Table 2** Descriptive Statistics, Within-Person and Between-Person Correlations Among Variables

Study variable	Mean	SD	ICC	1	2	3	4	5	6	7	8
1. Strengths use	4.48	1.32	.56		.61**	.43**	-.13*	.43**	-.04	-.04	.01
2. Meaningfulness	4.78	1.32	.57	.86**		.58**	-.02	.50**	.12*	.10	.00
3. Personal growth	4.69	1.43	.56	.71**	.77**		.03	.55**	.03	.05	.00
4. Negative affect	2.43	1.36	.64	-.28**	-.27**	-.15		-.12*	.10*	.05	-.04
5. Positive affect	4.55	1.47	.66	.69**	.78**	.78**	-.27**		.01	.00	.01
6. Attentional performance (IC)	1266.26	313.27	.59	-.31**	-.26**	-.09*	.07	-.13		.52**	.46**
7. Attentional performance (CC)	1224.47	564.91	.47	-.22*	-.23*	-.08	.25*	-.18	.49**		-.47**
8. Stroop effect	126.54	154.28	.14	.01	.06	.02	-.22*	.10	.21	-.74**	

ICC = intra-class correlation. Correlations below the diagonal are correlational coefficients on between-person level (N=86), which is calculated based on the mean of each person across five (or less) working days; correlations above the diagonal are correlational coefficients on within-person level (centering on person-mean; N=365). We have three attention-related variables in this table, the IC means incongruent trials, while the CC means congruent trials in Stroop task. \*  $p < .05$ ; \*\*  $p < .001$

growth at work ( $\beta=0.38$ ,  $SE=0.07$ ,  $p<0.001$ ). In addition, strengths use was positively related to positive affect ( $\beta=0.38$ ,  $SE=0.06$ ,  $p<0.001$ ), but nonsignificantly related to negative affect ( $\beta=-0.11$ ,  $SE=0.07$ ,  $p=0.10$ ). Results regarding  $\Delta R^2$  showed that strengths use explained 37.6% of the within-person variance in meaningfulness, 18.8% for personal growth, 18.5% for positive affect, and 1.8% for negative affect, respectively. Therefore, Hypotheses 2 was supported.

Hypothesis 3 states that strengths use is negatively related to attentional performance through eudaimonic and hedonic well-being. Table 3 showed that meaningfulness at work was negatively related to attentional performance (*longer reaction time*:  $\beta=0.25$ ,  $SE=0.09$ ,  $p=0.004$ ). That is, those who reported experiencing more meaningfulness during the previous hour, showed longer reaction times in the Stroop task. Personal growth in the previous hour was not significantly related to attentional performance ( $\beta=-0.03$ ,  $SE=0.09$ ,  $p=0.76$ ). Also, positive affect was not significantly related to attentional performance ( $\beta=-0.05$ ,  $SE=0.07$ ,  $p=0.45$ ). Negative affect was not related to attentional performance in congruent trials ( $\beta=-0.02$ ,  $SE=0.04$ ,  $p=0.63$ ) and attentional performance in incongruent trials ( $\beta=0.07$ ,  $SE=0.05$ ,  $p=0.19$ ). In addition, none of the well-being indicators were associated with Stroop effect ( $p\geq 0.521$ ).

Further, although strengths use was not directly related to attentional performance, since strengths use was shown to be linked to meaningfulness, which had a significant relation with attentional performance, we tested the indirect effect of strengths use on attentional performance through meaningfulness and positive affect by following Preacher et al. (2011) procedure. Table 4 showed that strengths use was negatively and significantly associated with performance in congruent trials via meaningfulness at work ( $B=40.07$ ,  $SE=18.04$ ,  $p=0.03$ , 95% CI=[4.70, 75.45]), and also indirectly through meaningfulness, related to performance in incongruent trials ( $B=33.61$ ,  $SE=11.84$ ,  $p=0.005$ , 95% CI=[10.39, 56.83]). There were no significant indirect effects, however, via personal growth ( $B=-10.53$ ,  $SE=12.50$ ,  $p=0.40$ , 95% CI=[-35.03, 13.97]) or positive affect ( $B=-7.04$ ,  $SE=8.04$ ,  $p=0.38$ , 95% CI=[-22.80, 8.72]). Therefore, Hypothesis 3a about meaningfulness and attentional performance was supported, but Hypothesis 3b was rejected (Table 5).

## 5.4 Additional Analyses

We also tested the aforementioned relationships at the between-person level. At this level, results were as follows: SU-meaningfulness ( $\beta=0.96$ ,  $SE=0.03$ ,  $p<0.001$ ), SU-personal growth ( $\beta=0.91$ ,  $SE=0.06$ ,  $p<0.001$ ), SU-positive affect ( $\beta=0.89$ ,  $SE=0.07$ ,  $p<0.001$ ), SU-negative affect ( $\beta=-0.279$ ,  $SE=0.14$ ,  $p=0.04$ ). These results are in line with the within-person effects. Regarding attentional performance, meaningfulness-attentional performance in congruent trials (ATC;  $\beta=-0.16$ ,  $SE=0.82$ ,  $p=0.84$ ); personal growth-ATC ( $\beta=0.06$ ,  $SE=0.46$ ,  $p=0.89$ ); positive affect-ATC ( $\beta=0.39$ ,  $SE=0.36$ ,  $p=0.28$ ), negative affect-ATC ( $\beta=0.01$ ,  $SE=0.21$ ,  $p=0.97$ ). The effects of well-being on attentional performance in incongruent trials were also not significant ( $p>0.20$ ).

## 6 Discussion

In the current study, we examined the relationships between strength use, eudaimonic and hedonic well-being, and attentional performance. We built upon strength use theory and the episodic process model (Beal et al., 2005) and tested the hypothesis that strengths use

**Table 3** Within–Person Relationships of Strengths Use with Eudaimonic and Hedonic Well-being at Work

Variables	Meaningfulness			Personal growth			Positive affect			Negative affect		
	$\beta$	SE	p	$\beta$	SE	p	$\beta$	SE	p	$\beta$	SE	p
Intercept	4.75	.12	<.001	4.68	.12	<.001	4.55	.13	<.001	2.42	.12	<.001
Strengths use	.54	.06	<.001	.38	.07	<.001	.38	.06	<.001	-.11	.07	.10
<i>Variances</i>												
Within-person level	.40	.07	<.001	.75	.10	<.001	.67	.09	<.001	.59	.08	<.001
Between-person level	.95	.18	<.001	.90	.19	<.001	1.06	.19	<.001	1.17	.22	<.001
Explained variances	37.6%			18.8%			18.5%			1.8%		

N = 86 individuals; N = 360 occasions

**Table 4** Within-Person Relationships Between the Eudaimonia, Positive and Negative Affect at Work and Attention Performance

Variables	Attentional performance in congruent trials						Attentional performance in incongruent trials					
	Step 1			Step 2			Step 1			Step 2		
	$\beta$	SE	P	$\beta$	SE	P	$\beta$	SE	P	$\beta$	SE	P
Intercept	5.63	1.23	<.01	5.45	1.11	<.01	6.18	.96	<.01	6.02	.78	<.01
Previous ATC	.62	.13	<.01	.69	.09	<.01						
Previous ATI							.05	.08	.57	.11	.07	.11
Strengths use	.06	.05	0.27	.06	.07	.37	.02	.06	.77	-.09	.08	.25
Meaningfulness				-.01	.07	.94				<b>.25</b>	<b>.09</b>	<b>&lt;.01**</b>
Personal growth				.05	.06	.43				-.03	.09	.76
Positive affect				-.06	.06	.27				-.05	.07	.45
Negative affect				-.02	.04	.63				.07	.05	.19
<i>Variances</i>												
Within-person level	8890.80	924.66	<.01	8821.99	914.63	<.01	28,212.49	2984.29	<.01	26,644.52	2818.83	<.01
Between-person level	38,082.08	6644.03	<.01	38,057.10	6675.67	<.01	42,672.87	8566.54	<.01	43,010.39	8537.87	<.01

Bold represents that this number is statistically significant

N = 84 individuals; N = 252–261 occasions. ATC = attentional performance in congruent trials. ATI = attentional performance in incongruent trials

\*\* p < .01

**Table 5** Indirect Effects of Well-being Between Strengths Use and Attentional Performance

Indirect path	Estimate	SE	<i>p</i>	95% CI
SU→MF→ATC	40.07	18.04	.03*	[4.70, 75.45]
SU→PG→ATC	- 10.53	12.50	.40	[- 35.03, 13.97]
SU→MF→ATI	33.61	11.84	.005**	[10.39, 56.83]
SU→PG→ATI	- 4.51	9.54	.64	[- 23.22, 14.19]
SU→PO→ATC	- 7.04	8.04	.38	[- 22.80, 8.72]
SU→NE→ATC	- 3.54	3.56	.32	[- 10.52, 3.44]
SU→PO→ATI	- 14.77	8.97	.10	[- 32.37, 2.81]
SU→NE→ATI	- 2.87	2.91	.32	[- 8.58, 2.83]

*SU* = strengths use, *MF* = meaningfulness, *PG* personal growth, *PO* = positive affect, *NE* = negative affect, *ATI* = attentional performance in incongruent trials, *ATC* = attentional performance in congruent trials. Reported are unstandardized values since Mplus cannot provide standardized values when using Montecarlo method

\*\**p* < .01; \**p* < .05

in a specific work episode is negatively associated with attentional performance in the subsequent episode. In addition, we expected a mediating role of eudaimonic well-being and hedonic well-being. Results showed that the total effect of strengths use on attention performance was not significant, but strength use at work was indeed positively related to meaningfulness, personal growth, and positive affect. In turn, only meaningfulness was negatively associated with subsequent attentional performance, which partially confirmed our hypotheses. On the other hand, the hypothesis regarding the direct relationship between positive affect and attentional performance was not supported. Below, we elaborate on the potential theoretical reasons and practical implications of these findings.

## 6.1 Theoretical Implications

Several studies have shown that too much work engagement may bring adverse effects, such as risk-taking, addictive behavior (e.g., workaholism), and ill-health (Foody et al., 2013; Schüler & Nakamura, 2013). Although our findings did not fully reflect the potential downsides of strengths use because the total effects of strengths use on attentional performance were not significant. Yet, there seemed to be a negative association between a sense of meaningfulness accompanying strengths use during the previous work episode and subsequent attentional performance.

The reasons why we did not find a direct negative effect of strengths use on attention may be complex because performance on the Stroop task may depend on several factors, including how long individuals have used their strengths (e.g., resources depletion; Liu et al., 2021) and how well people can adjust their attentional focus (Leroy, 2009). These factors may even fluctuate across work episodes. Personal growth may not have accounted for the indirect effects maybe because personal growth is more concerned with a sense towards self rather than to tasks (Van Woerkom & Meyers, 2019). Future studies are encouraged to take into account the ability to focus and contextual factors when investigating attentional performance.

The present study contributes to the literature in the following ways. First, several previous studies reported associations between strengths use and attentional performance (Dubreuil et al., 2014), yet, to the best of our knowledge, those studies only used

self-reports and between-subject designs (de Sampaio Barros et al., 2018). The present study, however, used an objective performance measure, namely the well-known Stroop task. Although the results were not straightforward, all in all, the evidence points to a negative indirect association between strength use and subsequent attentional performance.

Moreover, as hypothesized, our results revealed that employees only showed decreased attentional performance after the episodes in which they reported a high level of meaningfulness. These results may differ from prior studies as some of them have shown that well-being improves performance (Bakker et al., 2019; Dubreuil et al., 2014; Van Woerkom et al., 2016). As we assessed the employees' attentional performance *immediately after* the work episode, the associations between strengths use, well-being and attentional performance might be different from the typical long-term effects or cross-sectional effects found with the designs used in previous studies (de Sampaio Barros et al., 2018; Phillips et al., 2002; Rowe et al., 2007). Possible explanation is that the previous focused attention (i.e., when using strengths) may compromise attentional performance on the present task because one likely ruminates on the previous work content. Of course, the focused level on the present task might also depend on whether the previous task has been completed (Newton et al., 2020). If the previous task has been completely finished and attentional resources may be freed from the previous task, this may mitigate the adverse effect from the previous episode.

Second, although it is well established that using one's strengths is associated with enhanced well-being (see a review, Miglianico et al., 2020), our study adds to this line of literature by distinguishing the respective association between strengths use and eudaimonic and hedonic well-being. Prior studies have solely focused on one or two well-being indicators such as positive affect and work engagement. We contribute to this literature by showing that strengths use is positively related to the more comprehensive classification of well-being. Moreover, we focus on well-being at the within-person level, especially at the episodic level, which expands the literature that discusses the within-person relations between strengths use and well-being (Bakker et al., 2019; Van Woerkom et al., 2016). An episodic level approach sheds light on the more proximal outcomes produced by strengths use and helps to understand the more micro-level relationship between behavior, well-being, and performance at work. Our findings suggest that people may create or improve their own well-being (not performance) by proactively using their strengths. For example, to foster well-being at work, employees can seek tasks they are relatively good at doing (e.g., telling jokes, organizing meetings, and expressing appreciation to others). Practice on those tiny behaviors should gradually increase their sense of meaningfulness as well as positive affect inspired by the current study.

Moreover, we found that strength use and attentional performance were indirectly related through meaningfulness. Interestingly, Pattnaik and Jena (2020) have found that if individuals experience deeply meaningful work, they might also become self-centric, which negatively affects their camaraderie at work and family ties. Similarly, our findings indicate that meaningfulness may compromise attentional performance because employees might still be too involved in meaningful tasks they were engaged in before they worked on the Stroop task. Correspondingly, we suggest that employees should detach and recover, such as taking a break, after the meaningful episode, which may promote their subsequent performance (Liu et al., 2021).

Third, previous literature indicates that positive affect may have a spillover effect (Newton et al., 2020) and is likely to be related to subsequent performance. However, the present study did not reflect this effect. There are several possible explanations for this. First, people's mood may change rapidly in the work environment due to specific events during a

day (Gabriel et al., 2019). Even if happiness accumulates within periods in which one uses their strengths, mood may change quickly when working on other content, which may link to subsequent performance. Second, it is worth noting that the evidence concerning the effect of positive affect on attentional performance is still competing. Although we tend to adopt an adverse effect of positive mood on attention at an episodic level in the current study, some research also supports that positive affect may promote attentional performance because positive affect increases cognitive control and flexibility (Dreisbach & Goschke, 2004; Van der Stigchel et al., 2011). At the same time, whether positive affect broadens or narrows attention might also depend on the type of motivation (Gable & Harmon-Jones, 2008). For example, when approach motivation is high, positive affect broadens attention. The reverse is true when approach motivation is low (Paul et al., 2021).

## 6.2 Practical Implications

Work is a sequential process composed of different performance episodes. Thus, it is important to understand how work episodes are associated with one another to determine employee's performance and well-being. First, employees should pay more attention to the management of their working states across episodes. For example, inspired by the current study, employees are encouraged to detach from previous episodes if they focus on the preceding tasks for a long time (Sonnentag et al., 2008). Considering that a person may have consumed a lot of energy if they are immersed in the previous work episode, we expect that it is beneficial for employees to "get out" from the previous tasks and then dedicate themselves to newly introduced tasks. Detachment from an episode in which people are totally engaged, may help people to recharge and recover, which is also recognized by Sonnentag et al. (2008).

Second, employees may take their own initiative to increase well-being at work. Use of strengths partly depends on the relevance between situation and strong points (i.e., excellent skills), but strengths use is also considered a proactive behavior that employees can use and exert at work. For example, Bakker and Van Woerkom (2017) argued that employees could determine their own well-being (i.e., flow experience) at work using proactive strategies. The strategies include strengths use, job crafting, playful work design, etc. The employee's proactivity helps to satisfy basic psychological needs, which, in turn, promotes functioning at work. For example, if an employee is good at organizing social activities, then they can proactively undertake the responsibility to organize colleague gatherings (i.e., coffee break). In this way, they can better satisfy both their own and organizational needs and thus feel happier.

Third, institutions and organizations should encourage their employees to identify and use their strengths at work. Despite the unfavorable effects that strength use might cause to the subsequent episode, employees can indeed harvest personal growth and meaningfulness at work, facilitating their well-being within the same episode. Positive affect also concurs with the strength use behavior, indicating that employees may feel much happier and be more creative along with strength use (Amabile et al., 2005). Strategies that companies can use are as providing support for employees to use their strengths (Van Woerkom et al., 2016). For example, organizations could allow their employees to do their job in a manner that best suits their strong points. Or organizations give more opportunities to employees to do the things that they are good at. Leaders can also learn to identify their own strengths

and try to use the strengths more often, because the literature reveals that strength-based leadership effectively boosts employees' performance (Rath & Conchie, 2008).

## 7 Limitations and Future Research

Our study has some limitations that need to be mentioned. First, the present findings are limited to this sample. The majority of the participants in the current study were female (more than 70%). Furthermore, the current study was conducted in the Chinese context, known as characterized by collectivism compared to western culture. Therefore, it is not sure whether our findings could be extended to a broader sample including different cultures. In the future, a larger sample consisting of more males and participants from western culture are encouraged to consolidate the current findings.

Second, this study did not establish a causal relationship between the study variables. Although participants performed the attentional performance task directly after they reported on the strengths use during the previous hour, they were still measured relatively close in time to each other and in the same work episode. Measuring variables simultaneously does not help establish causal-like relationships and may increase the strength of associations between the study variables (e.g., strengths use, positive affect; Podsakoff et al., 2012). Therefore, we cannot draw causal inferences but mainly assessed associations. However, multilevel confirmatory factor analyses results showed that a five-factor model fitted the data well, indicating that the study variables, including strengths use, meaningfulness, personal growth, positive affect, and negative affect, can indeed be empirically distinguished. The within-person correlations between the subjective measures ranged from 0.61 to 0.03, suggesting that the maximum of overlap at the within-person level is 36%. Moreover, as we included a computerized task to measure attentional performance directly after the one-hour work episode, the objective data can mitigate the downsides of single subjective measurement.

While studies have shown that strengths use can have an impact on positive affect (Bakker et al., 2019; Liu et al., 2021; Van Woerkom et al., 2016), the relationship may also be reversed as happy individuals may have more resources (Fredrickson, 2001). Indeed, we have tested the reverse order and found that strengths use indeed predicted meaningfulness and negative affect, but personal growth and positive affect also predicted strengths use (see Supplementary Materials). In the future, we encourage researchers to investigate strengths use – well-being relationships using longitudinal and experimental designs to establish more causal-like associations (Bakker & Van Wingerden, 2020).

Lastly, although the current study is highlighted by the implementation of a computerized task (Stroop task), the majority of studies employing Stroop task have been conducted in the laboratorial environment. It is less likely that we invited employees to the laboratory to conduct the task as we aimed to focus on employee well-being and performance in the field. Therefore, it is not clear whether employees at their workplace completed the Stroop task with full concentration, or performing it while talking with colleagues, listening to music, holding a meeting. Future studies are also encouraged to take into account the context as well as the type and content of subsequent tasks because individuals may have different (intrinsic) motivations towards subsequent tasks depending on whether it fits personal strengths.

## 8 Concluding Remarks

This study reveals that strength use in the preceding one hour is associated with eudaimonic well-being and hedonic well-being at work. However, despite such higher meaningfulness and positive affect, the experienced well-being does not contribute to the subsequent work episode's attentional performance. The results suggest that, on the one hand, organizations should encourage their employees to use more of their strengths during their work because it improves employees' well-being; on the other hand, employees should take care of how to adjust their attention to fit the rapidly changing rhythm of work, especially learning to detach from an immersed work episode.

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## Declarations

**Conflict of interest** The authors have no known conflicts of interest to disclose.

**Ethical Standards** The original data and modelling codes are deposited in a data repository and available at OSF (<https://osf.io/9kqwp/>). The current study strictly followed the guidelines and ethical standards of our university and department.

**Informed Consent** All participants gave informed consent to participate in the study and had the opportunity to withdraw their participation if they would like. All the authors have given consent to potential publication of this article.

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## References

- Amabile, T. M., Barsade, S. G., Mueller, J. S., & Staw, B. M. (2005). Affect and creativity at work. *Administrative Science Quarterly*, *50*(3), 367–403. <https://doi.org/10.2189/asqu.2005.50.3.367>
- Ashby, F. G., Valentin, V. V., & Turken, A. U. (2002). The effects of positive affect and arousal on working memory and executive attention. *Advances in Consciousness Research*, *44*, 245–287. <https://doi.org/10.1075/aicr.44.11ash>
- Bakker, A. B., Hetland, J., Olsen, O. K., & Espevik, R. (2019). Daily strengths use and employee well-being: The moderating role of personality. *Journal of Occupational and Organizational Psychology*, *92*(1), 144–168. <https://doi.org/10.1111/joop.12243>
- Bakker, A. B., & Oerlemans, W. G. (2019). Daily job crafting and momentary work engagement: A self-determination and self-regulation perspective. *Journal of Vocational Behavior*, *112*, 417–430. <https://doi.org/10.1016/j.jvb.2018.12.005>
- Bakker, A. B., & Van Wingerden, J. (2020). Do personal resources and strengths use increase work engagement? The effects of a training intervention. *Journal of Occupational Health Psychology*, *1*, 2. <https://doi.org/10.1037/ocp0000266>

- Bakker, A. B., & Van Woerkom, M. (2017). Flow at work: A self-determination perspective. *Occupational Health Science*, 1(1), 47–65. <https://doi.org/10.1007/s41542-017-0003-3>
- Bakker, A. B., & Van Woerkom, M. (2018). Strengths use in organizations: A positive approach of occupational health. *Canadian Psychology/psychologie Canadienne*, 59(1), 38–46. <https://doi.org/10.1037/cap0000120>
- Bassi, M., Steca, P., Monzani, D., Greco, A., & Delle Fave, A. (2014). Personality and optimal experience in adolescence: Implications for well-being and development. *Journal of Happiness Studies*, 15(4), 829–843. <https://doi.org/10.1007/s10902-013-9451-x>
- Beal, D. J., Weiss, H. M., Barros, E., & MacDermid, S. M. (2005). An episodic process model of affective influences on performance. *Journal of Applied Psychology*, 90(6), 1054–1068. <https://doi.org/10.1037/0021-9010.90.6.1054>
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185–216. <https://doi.org/10.1177/135910457000100301>
- Callender, J. C., & Osburn, H. G. (1977). A method for maximizing split-half reliability coefficients. *Educational and Psychological Measurement*, 37(4), 819–825. <https://doi.org/10.1177/001316447703700402>
- Cangiano, F., Parker, S. K., & Ouyang, K. (2021). Too proactive to switch off: When taking charge drains resources and impairs detachment. *Journal of Occupational Health Psychology*, 26(2), 142–154. <https://doi.org/10.1037/ocp0000265>
- de Sampaio Barros, M. F., Araújo-Moreira, F. M., Trevelin, L. C., & Radel, R. (2018). Flow experience and the mobilization of attentional resources. *Cognitive, Affective and Behavioral Neuroscience*, 18(4), 810–823. <https://doi.org/10.3758/s13415-018-0606-4>
- Dreisbach, G., & Goschke, T. (2004). How positive affect modulates cognitive control: Reduced perseveration at the cost of increased distractibility. *Journal of Experimental Psychology: Learning Memory and Cognition*, 30(2), 343–353. <https://doi.org/10.1037/0278-7393.30.2.343>
- Dubreuil, P., Forest, J., & Courcy, F. (2014). From strengths use to work performance: The role of harmonious passion, subjective vitality, and concentration. *Journal of Positive Psychology*, 9(4), 335–349. <https://doi.org/10.1080/17439760.2014.898318>
- Engeser, S., & Rheinberg, F. (2008). Flow, performance and moderators of challenge-skill balance. *Motivation and Emotion*, 32(3), 158–172. <https://doi.org/10.1007/s11031-008-9102-4>
- Footy, M., Barnes-Holmes, Y., & Barnes-Holmes, D. (2013). On making people more positive and rational: The potential downsides of positive psychology interventions. In B. K. Todd & V. C. Joseph (Eds.), *Mindfulness, acceptance, and positive psychology: The seven foundations of well-being* (pp. 166–193). Context Press.
- Franzen, M. D., Tishelman, A. C., Sharp, B. H., & Friedman, A. G. (1987). An investigation of the test-retest reliability of the stroop colorword test across two intervals. *Archives of Clinical Neuropsychology*, 2(3), 265–272. <https://doi.org/10.1093/arclin/2.3.265>
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology. The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226. <https://doi.org/10.1037/0003-066X.56.3.218>
- Gable, P. A., & Harmon-Jones, E. (2008). Approach-motivated positive affect reduces breadth of attention. *Psychological Science*, 19(5), 476–482. <https://doi.org/10.1111/j.1467-9280.2008.02112.x>
- Gabriel, A. S., Podsakoff, N. P., Beal, D. J., Scott, B. A., Sonnentag, S., Trougakos, J. P., & Butts, M. M. (2019). Experience sampling methods: A discussion of critical trends and considerations for scholarly advancement. *Organizational Research Methods*, 22(4), 969–1006. <https://doi.org/10.1177/1094428118802626>
- Gardner, D. G., Dunham, R. B., Cummings, L. L., & Pierce, J. L. (2011). Focus of attention at work: Construct definition and empirical validation. *Wiley Online Library*, 62(1), 61–77. <https://doi.org/10.1111/j.2044-8325.1989.tb00478.x>
- George, J. M. (1991). State or trait: Effects of positive mood on prosocial behaviors at work. *Journal of Applied Psychology*, 76(2), 299–307. <https://doi.org/10.1037/0021-9010.76.2.299>
- Ghielen, S. T. S., Van Woerkom, M., & Christina Meyers, M. (2018). Promoting positive outcomes through strengths interventions: A literature review. *Journal of Positive Psychology*, 13(6), 573–585. <https://doi.org/10.1080/17439760.2017.1365164>
- Golden, C., & Freshwater, S. (2002). *The stroop color and word test: A manual for clinical and experimental uses*. Chicago, IL: Stoelting.
- Henderson, L. W., Knight, T., & Richardson, B. (2013). An exploration of the well-being benefits of hedonic and eudaimonic behaviour. *Journal of Positive Psychology*, 8(4), 322–336. <https://doi.org/10.1080/17439760.2013.803596>

- Lavie, N. (2010). Attention, distraction, and cognitive control under load. *Current Directions in Psychological Science*, 19(3), 143–148. <https://doi.org/10.1177/0963721410370295>
- Leroy, S. (2009). Why is it so hard to do my work? The challenge of attention residue when switching between work tasks. *Organizational Behavior and Human Decision Processes*, 109(2), 168–181. <https://doi.org/10.1016/j.obhdp.2009.04.002>
- Littman-Ovadia, H., Lavy, S., & Boiman-Meshita, M. (2017). When theory and research collide: Examining correlates of signature strengths use at work. *Journal of Happiness Studies*, 18(2), 527–548. <https://doi.org/10.1007/s10902-016-9739-8>
- Liu, W., van der Linden, D., & Bakker, A. B. (2021). Strengths use and work-related flow: An experience sampling study on implications for risk taking and attentional behaviors. *Journal of Managerial Psychology*. <https://doi.org/10.1108/JMP-07-2020-0403>
- Luyckx, K., & Robitschek, C. (2014). Personal growth initiative and identity formation in adolescence through young adulthood: Mediating processes on the pathway to well-being. *Journal of Adolescence*, 37(7), 973–981. <https://doi.org/10.1016/j.adolescence.2014.07.009>
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7(1), 83–104. <https://doi.org/10.1037/1082-989X.7.1.83>
- Martela, F., Ryan, R. M., & Steger, M. F. (2018). Meaningfulness as satisfaction of autonomy, competence, relatedness, and beneficence: Comparing the four satisfactions and positive affect as predictors of meaning in life. *Journal of Happiness Studies*, 19(5), 1261–1282. <https://doi.org/10.1007/s10902-017-9869-7>
- Mathieu, J. E., Aguinis, H., Culpepper, S. A., & Chen, G. (2012). Understanding and estimating the power to detect cross-level interaction effects in multilevel modeling. *Journal of Applied Psychology*, 97(5), 951–966. <https://doi.org/10.1037/a0028380>
- May, D. R., Gilson, R. L., & Harter, L. M. (2004). The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *Journal of Occupational and Organizational Psychology*, 77(1), 11–37. <https://doi.org/10.1348/096317904322915892>
- Miglianico, M., Dubreuil, P., Miquelon, P., Bakker, A. B., & Martin-Krumm, C. (2020). Strength use in the workplace: A literature review. *Journal of Happiness Studies*, 21(2), 737–764. <https://doi.org/10.1007/s10902-019-00095-w>
- Muthén, L. K., & Muthén, B. O. (2017). *Mplus User's Guide*. (Eighth Edn). CA: Muthén & Muthén.
- Nagel, T. (1972). Aristotle on eudaimonia. *Phronesis*, 17(3), 252–259. <https://doi.org/10.1163/156852872X00079>
- Newton, D. W., LePine, J. A., Kim, J. K., Wellman, N., & Bush, J. T. (2020). Taking engagement to task: The nature and functioning of task engagement across transitions. *Journal of Applied Psychology*, 105(1), 1–18. <https://doi.org/10.1037/apl0000428>
- Oaksford, M., Grainger, B., Morris, F., & Williams, J. M. G. (1996). Mood, reasoning, and central executive processes. *Journal of Experimental Psychology: Learning Memory and Cognition*, 22(2), 476–492. <https://doi.org/10.1037/0278-7393.22.2.476>
- Pattnaik, S., & Jena, L. K. (2020). Could self-centrism rust the glitter of meaningful work? Exploring the darker sides of the construct. *Development and Learning in Organizations: An International Journal*, 35(4), 11–14. <https://doi.org/10.1108/DLO-03-2020-0060>
- Paul, K., Pourtois, G., van Steenbergen, H., Gable, P., & Dreisbach, G. (2021). Finding a balance: Modulatory effects of positive affect on attentional and cognitive control. *Current Opinion in Behavioral Sciences*, 39, 136–141. <https://doi.org/10.1016/j.cobeha.2021.03.002>
- Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification*. Oxford: Oxford University Press.
- Phillips, L. H., Bull, R., Adams, E., & Fraser, L. (2002). Positive mood and executive function: Evidence from stroop and fluency tasks. *Emotion*, 2(1), 12–22. <https://doi.org/10.1037/1528-3542.2.1.12>
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63, 539–569. <https://doi.org/10.1146/annurev-psych-120710-100452>
- Preacher, K. J., Zhang, Z., & Zyphur, M. J. (2011). Alternative methods for assessing mediation in multilevel data: The advantages of multilevel SEM. *Structural Equation Modeling*, 18(2), 161–182. <https://doi.org/10.1080/10705511.2011.557329>
- Rath, T., & Conchie, B. (2008). *Strengths based leadership: Great leaders, teams, and why people follow*. Simon and Schuster.
- Rogers, C. R. (1963). Toward a science of the person. *Journal of Humanistic Psychology*, 3(2), 72–92.

- Rowe, G., Hirsh, J. B., & Anderson, A. K. (2007). Positive affect increases the breadth of attentional selection. *Proceedings of the National Academy of Sciences*, *104*(1), 383–388. <https://doi.org/10.1073/pnas.0605198104>
- Ryan, R. M., Huta, V., & Deci, E. L. (2008). Living well: A self-determination theory perspective on eudaimonia. *Journal of Happiness Studies*, *9*(1), 139–170. <https://doi.org/10.1007/s10902-006-9023-4>
- Scarpina, F., & Tagini, S. (2017). The stroop color and word test. *Frontiers in Psychology*, *8*, 557. <https://doi.org/10.3389/fpsyg.2017.00557>
- Schüler, J., & Nakamura, J. (2013). Does flow experience lead to risk? How and for whom. *Applied Psychology: Health and Well-Being*, *5*(3), 311–331. <https://doi.org/10.1111/aphw.12012>
- Sonnentag, S., Mojza, E. J., Binnewies, C., & Scholl, A. (2008). Being engaged at work and detached at home: A week-level study on work engagement, psychological detachment, and affect. *Work & Stress*, *22*(3), 257–276. <https://doi.org/10.1080/02678370802379440>
- Straume, L. V., & Vittersø, J. (2012). Happiness, inspiration and the fully functioning person: Separating hedonic and eudaimonic well-being in the workplace. *Journal of Positive Psychology*, *7*(5), 387–398. <https://doi.org/10.1080/17439760.2012.711348>
- Turban, D. B., & Yan, W. (2016). Relationship of eudaimonia and hedonia with work outcomes. *Journal of Managerial Psychology*, *31*(6), 1006–1020. <https://doi.org/10.1108/JMP-07-2015-0271>
- Van der Linden, D., Frese, M., & Meijman, T. F. (2003). Mental fatigue and the control of cognitive processes: Effects on perseveration and planning. *Acta Psychologica*, *113*(1), 45–65. [https://doi.org/10.1016/S0001-6918\(02\)00150-6](https://doi.org/10.1016/S0001-6918(02)00150-6)
- Van der Stigchel, S., Imants, P., & Ridderinkhof, K. R. (2011). Positive affect increases cognitive control in the antisaccade task. *Brain and Cognition*, *75*(2), 177–181. <https://doi.org/10.1016/j.bandc.2010.11.007>
- Van Woerkom, M., & Meyers, M. C. (2019). Strengthening personal growth: The effects of a strengths intervention on personal growth initiative. *Journal of Occupational and Organizational Psychology*, *92*(1), 98–121. <https://doi.org/10.1111/joop.12240>
- Van Woerkom, M., Oerlemans, W., & Bakker, A. B. (2016). Strengths use and work engagement: A weekly diary study. *European Journal of Work and Organizational Psychology*, *25*(3), 384–397. <https://doi.org/10.1080/1359432X.2015.1089862>
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063–1070. <https://doi.org/10.1037/0022-3514.54.6.1063>
- Wood, A. M., Linley, P. A., Maltby, J., Kashdan, T. B., & Hurling, R. (2011). Using personal and psychological strengths leads to increases in well-being over time: A longitudinal study and the development of the strengths use questionnaire. *Personality and Individual Differences*, *50*(1), 15–19. <https://doi.org/10.1016/j.paid.2010.08.004>

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