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## Full Length Article

## Daily playful work design: A trait activation perspective

Yuri S. Scharp<sup>a,\*</sup>, Kimberley Breevaart<sup>a</sup>, Arnold B. Bakker<sup>a,b</sup>, Dimitri van der Linden<sup>a</sup><sup>a</sup>Erasmus University Rotterdam, Center of Excellence for Positive Organizational Psychology, the Netherlands<sup>b</sup>University of Johannesburg, South Africa

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## ABSTRACT

We introduce the concept of daily playful work design (PWD) and test the factorial validity of a new instrument to assess PWD. Using trait activation theory, we hypothesize that employees who are more open to experiences and playful will be more engaged and creative in their work on the days they playfully design their work activities. We tested the factorial validity of the instrument and our hypotheses in a sample of 88 employees who answered questionnaires during five consecutive workdays (N = 391 observations). The multilevel analyses yielded evidence for the psychometric quality of the PWD instrument and generally supported the hypotheses. The traits openness and playfulness moderated the relationship of daily PWD behaviors with daily work engagement and creativity.

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Some individuals are able to find joy in almost every task they carry out and often get fully immersed in their work activities. Even when the task is relatively simple or repetitive, they approach it with enthusiasm and invest considerable effort. What drives this energy and focus? In this study, we propose that employees may proactively shape their work experience through *play*. Although play is fundamental to human culture (Huizinga, 1949), it remains one of the least understood phenomena in organizations (Mainemelis & Ronson, 2006). We argue that employees may approach their work playfully to design fun and competition in their work – a proactive cognitive-behavioral work orientation we call *playful work design* (PWD). Moreover, we contend that PWD builds the necessary resources for creativity—the production of novel and appropriate responses, products, or solutions (Amabile & Mueller, 2008). Innovation is vital to organizational functioning, since creative ideas may solve challenging business problems and result in valuable products and services (Amabile, 1997). While lab experiments with students, field studies among children, and qualitative studies among employees support the contention that play fosters positive affect and creativity (e.g., Csikszentmihalyi, 1975b; Csikszentmihalyi, 1997; Guitard,

Ferland, & Dutil, 2005; Lieberman, 2014; Russ, Robins, & Christiano, 1999; Vandenberg, 1980), a more dynamic and ecologically valid approach is needed to fully uncover how play is related to positive affect and creativity in a work context. That is, we make a crucial contribution to the literature by investigating these relationships among people at work using daily diary methodology.

Hence, in the present study, we will investigate daily fluctuations in PWD, work engagement (i.e., work-related, activated positive affect; Bakker & Oerlemans, 2011), and creativity among a heterogeneous group of employees. We argue that employees are most creative on days they playfully design their work because this proactive cognitive-behavioral work orientation makes them more engaged in their work. Moreover, we study *for whom* PWD works best. Using trait activation theory (TAT; Tett, Simonet, Walser, & Brown, 2013), we develop a theoretical model in which individual differences in openness to experiences and playfulness influence the relationship of daily PWD with daily work engagement and creativity. We propose that the relationship of daily PWD with creativity through work engagement is stronger for employees with higher openness to experiences and playfulness because PWD satisfies their personal needs.

The current study makes three important contributions. First, we introduce daily PWD, a proactive cognitive-behavioral work orientation that employees may use on a daily basis to foster their work engagement. While the last decade has seen a surge in

\* Corresponding author at: Campus Woudestein, Rotterdam, Room T16-16, P.O. Box 1738, 3000 DR Rotterdam, the Netherlands.

E-mail address: [scharp@essb.eur.nl](mailto:scharp@essb.eur.nl) (Y.S. Scharp).

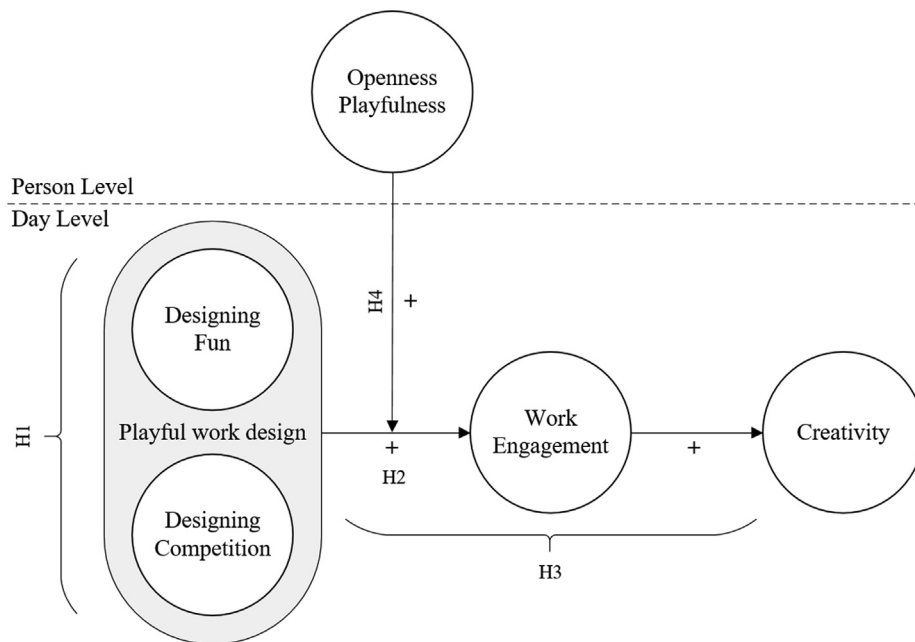


Fig. 1. The conceptual model of the hypothesized relationships.

interest in how employees proactively manage their environment and themselves (Bakker, 2017; Parker, Bindl, & Strauss, 2010), little is known about the role of play as a proactive work strategy. The present study sheds light on how play may act as a work strategy (i.e., PWD) to foster daily optimal functioning at work. Second, scholars have called for instruments that reliably and validly capture the use of play at work (Petelczyc, Capezio, Wang, Restubog, & Aquino, 2018). We answer this call by proposing and establishing a valid measurement instrument to assess daily PWD, which may stimulate future research on PWD. Specifically, we perform multi-level confirmatory factor analyses to test whether PWD can be assessed with two related factors, namely, designing fun and designing competition. Finally, we contribute to the trait activation literature by testing the hypothesis that daily PWD boosts work engagement particularly for individuals who are open to experiences and playful, because such a proactive cognitive-behavioral work orientation fits well with their personal needs. Thus, we propose a moderated-indirect effects model in which daily fluctuations in proactive work behavior interact with personality to predict creativity (Fig. 1). Employees are generally not consistently creative throughout the week but rather have creative “on” and “off” days (Binnewies & Wörnlein, 2011). The current study contributes to our understanding of what determines this variation in creativity and what employees can do themselves to manage their creativity throughout the week. Our study may also have important implications for practitioners because we highlight the role of employee personal initiative (Parker et al., 2010), which may complement management interventions focused on shaping the work experience and fostering creativity at work. Moreover, we investigate for whom PWD works best, which may guide more tailored interventions.

## 1. Overview

The present study introduces the measurement of daily PWD. The concept of playful work design was recently introduced by Scharp, Bakker, Breevaart, Kruup, and Uusberg (2018). In their study, the authors proposed an instrument to measure PWD at the trait level and presented evidence for its factor structure, reli-

ability, and validity. In the current study, we use an adapted version of this scale to measure PWD at a day level, and examine its relation with daily employee engagement and creativity, moderated by individual differences in personality. As scholars have raised questions regarding the validity of adapted, multilevel versions of measurement instruments (Breevaart, Bakker, Demerouti, & Hetland, 2012; Sonnentag, Dormann, & Demerouti, 2010), we decided to first examine whether the contextualized PWD instrument accurately describes and captures fluctuations in PWD (Phase 1) in our sample, before investigating how PWD is structurally related to work engagement and creativity on a daily basis in this sample (Phase 2; Fig. 1).

## 2. Phase 1: The measurement of daily playful work design

PWD refers to the proactive cognitive-behavioral work orientation that imposes the experiential qualities of play on work with play elements to design (1) fun and (2) competition (Scharp et al., 2018). This definition integrates the literature on play (Barnett, 2007; Csikszentmihalyi, 1975a; Lieberman, 2014) and the literature on proactive work strategies (Bakker, 2017; Parker & Collins, 2010). Play can be defined as a behavioral orientation (Mainemelis & Ronson, 2006) that imposes the experiential qualities of play on an activity (Barnett, 2007; Csikszentmihalyi, 1975b; Huizinga, 1949; Roy, 1959) through the use of play elements (Caillois, 1961; Huizinga, 1949; Lieberman, 2014; Suits, 1990), whereas proactive work strategies refer to how employees manage their work experience and performance (Bakker, 2017; Parker & Collins, 2010). PWD merges these two lines of research, as it describes how employees proactively design their work experience with play elements to design (1) fun and (2) competition in their work activities.

The dimensionality of PWD is based on the conceptual distinction between two clusters of play elements: ludic and agonistic play elements (Scharp et al., 2018). While ludic play elements, such as spontaneity, fantasy, and humor, mainly serve to create entertainment, amusement, and fun (Barnett, 2007; Caillois, 1961; Lieberman, 2014), agonistic play elements, such as goals, and rules, mainly serve to create challenge and competition (Caillois, 1961;

Csikszentmihalyi, 1975a; Huizinga, 1949). Thus, when employees playfully design *fun* in their work, they employ ludic play elements. For instance, a project discussion with a colleague becomes more fun when it turns playful through the use of wit and humor. Likewise, a group meeting on how to improve business solutions becomes more fun for everyone involved when playful and entertaining questions are used. In contrast, when employees playfully design *competition* in their work, they use agonistic play elements. For example, a journalist who needs to write a newspaper article may frame every paragraph as an exciting challenge and create self-set goals such as limiting the reuse of certain examples and conjunctive adverbs. In the same way, even responding to 25 e-mails may turn into an exciting competitive game when one wants to outperform yesterday's 30-minute record.

While we argue that some employees may be more inclined to use PWD than others, the use of PWD may also fluctuate from day to day within the same person. Thus, whereas personality may determine general levels of proactivity and the use of playful work design across time and situations, the daily enactment of PWD represents the intra-individual variation that may be the most proximal predictor of daily work engagement and creativity. This contention is in line with other findings showing that proactive work strategies such as self-management and job crafting fluctuate on a daily basis and can explain daily employee well-being and work behaviors (e.g., Breevaart, Bakker, & Demerouti, 2014; Petrou, Demerouti, Peeters, Schaufeli, & Hetland, 2012). To enable the study of daily PWD, we adjusted the general version of the PWD questionnaire (Scharp et al., 2018) so that it refers to the daily enactment of PWD rather than the use of PWD in general. We conduct multilevel confirmatory factor analyses to investigate whether PWD manifests itself in a similar way on the within-person (i.e., day) level as it does on the between-person (i.e., trait) level (i.e., isomorphism). Therefore, we propose the following:

**Hypothesis 1.** The two-factor structure – including the two factors of designing fun and designing competition – accurately describes and captures daily fluctuations in PWD.

### 3. Phase 1: Method

#### 3.1. Participants and procedure

Participants were recruited through social media and the personal network of the researchers. We first informed participants of the study's general purpose and indicated that, as an incentive to return the surveys, they would enroll in a raffle to win one of several prizes. This raffle consisted of five gift vouchers of five euros each and a one-day trip to Paris for two. Employees who expressed consent to participate received a questionnaire at 4 PM every day over the course of five working days. In total, 102 persons agreed to participate in our study. Since we are interested in daily fluctuations in the use of PWD within the same person, we only analyzed the data of participants who filled out at least three daily diary surveys. Accordingly, we removed 14 persons, resulting in a final sample of 88 employees (response rate is 86%). Participants completed the daily diary surveys for 4.44 days on average (total  $N = 88 * 4.44 = 391$  observations). Men and women were almost equally represented (53% male and 47% female). On average, participants were 32.18 years of age ( $SD = 11.13$ , ranging from 18 to 63) and had been in their current occupation for 4.44 years ( $SD = 5.24$ ). Most participants either completed higher vocational education (48.86%) or held a university degree (43.18%). A minority finished middle-level applied education (7.95%). Participants were employed in a wide variety of Dutch organizations focused on activities such as programming, administration, consultancy,

research, design, teaching, accountancy, nutrition, therapy, and recruitment.

#### 3.2. Measures

**Daily playful work design** was measured with an adapted version of the twelve-item Playful Work Design Scale (Scharp et al., 2018). We adapted the time frame of the PWD items so that they specifically referred to the past day, which is common practice in diary studies (Ohly, Sonnentag, Niessen, & Zapf, 2010). The scale includes two dimensions, i.e., designing fun and designing competition, measured by six items each (1 = never, 5 = very often). An example item for designing fun is "Today, I looked for humor in the things I needed to do." An example item for designing competition is "Today, I competed with myself at work – not because I had to, but because I enjoyed it" (See Table 1 for all items).

#### 3.3. Strategy of analysis

To test whether the two-factor structure accurately describes and captures daily PWD (Hypothesis 1), we conducted multilevel confirmatory factor analyses (MCFA) using Mplus software (Muthén & Muthén, 1998–2017) and followed the procedure developed by Muthén (1994). Whereas single-level CFA analyzes the total covariance matrix, MCFA divides this matrix into within- and between-person covariance matrices that are used to conduct factor analysis at both levels (Muthén, 1994). This procedure explicitly models the dependence of observations by accounting for the nested structure of days (Level 1;  $N = 391$ ) within persons (Level 2;  $N = 88$ ). Multilevel modeling is justified when sufficient variance is present at both levels, which is assessed with the intraclass correlation coefficient (ICC). In support of multilevel modeling, the 1-ICCs presented in Table 1 indicate that 37% to 52% of the variance in the items is explained at the within-person (i.e., day) level. We assessed model fit with the root mean square error of approximation (RMSEA), comparative fit index (CFI), and the standardized root mean square residual (SRMR). RMSEA values up to 0.08 and CFI values ranging between 0.90 and 0.95, as well as SRMR values up to 0.10, indicate acceptable fit (Schweizer, 2010).

### 4. Phase 1: Results

#### 4.1. Descriptive statistics

Table 1 presents the means, standard deviations, 1-ICCs, and factor loadings of the PWD items.

#### 4.2. Multilevel confirmatory factor analysis

Hypothesis 1 states that PWD can be assessed with two separate dimensions, namely, (1) designing fun and (2) designing competition. Thus, we expected that a two-factor structure would most accurately describe the data. In support of Hypothesis 1, Table 2 reveals that the two-factor model showed a good fit to the data,  $CFI = 0.96$ ,  $RMSEA = 0.03$ ,  $SRMR_{within} = 0.04$ ,  $SRMR_{between} = 0.07$ . We also tested the fit of a one-factor solution. Table 2 reveals that the one-factor model showed a reasonable fit to the data ( $RMSEA = 0.05$ ,  $SRMR_{within} = 0.06$ , and  $SRMR_{between} = 0.08$ ), but the CFI of 0.89 was below the 0.90 cut-off score. Moreover, the two-factor model outperformed the one-factor model, as indicated by a significant decrease in  $\chi^2$  ( $\Delta\chi^2(2) = 63.70$ ,  $p < .001$ ). All factor loadings for the two-factor model were significant ( $p$ 's  $< 0.014$ ). The results further revealed that the correlation between the latent factors of designing fun and designing competition was higher at

**Table 1**  
Descriptive statistics for the PWD instrument, including within- and between-person factor loadings of the two-factor solution.

	1-ICC	M	SD	$\lambda_1$	$\lambda_0$
<i>Designing fun</i> ( $\alpha = 0.82 - 0.88$ )					
1. Today, I approached my tasks creatively to make them more interesting	0.49	3.05	0.97	0.89	0.62
2. Today, I approached my work in a playful way	0.49	2.73	1.07	0.86	0.59
3. Today, I looked for humor in the things I needed to do	0.43	3.04	1.16	0.77	0.51
4. Today, I looked for ways to make tasks more fun for everyone involved	0.46	3.03	1.13	0.89	0.56
5. Today, I used my imagination to make my job more interesting	0.37	2.45	1.14	0.81	0.43
6. Today, I looked for ways to make my work more fun	0.48	2.87	1.05	0.84	0.45
<i>Designing competition</i> ( $\alpha = 0.72 - 0.81$ )					
7. Today, I pushed myself to do better even when it wasn't expected	0.49	3.41	1.05	0.75	0.43
8. Today, I approached my job as a series of exciting challenges	0.45	2.64	1.16	0.77	0.76
9. Today, I competed with myself at work – not because I had to, but because I enjoyed it	0.50	2.60	1.19	0.84	0.38
10. Today, I tried to make my job a series of exciting challenges	0.47	2.46	1.08	0.86	0.60
11. Today, I tried to keep score in all kinds of work activities	0.40	2.71	1.20	0.73	0.38
12. Today, I tried to set time records in my work tasks	0.52	3.18	1.08	0.39	0.27

Note. PWD = playful work design.  $\lambda_1$  = between-person factor loadings;  $\lambda_0$  = within-person factor loadings. All factor loadings are significant at  $p < .001$ , except item 12 ( $p = .014$ ). Designing fun and Designing competition correlated positively at the between-person level ( $r = 0.87, p < .001$ ) and the within-person level ( $r = 0.68, p < .001$ ). These correlations differ slightly from those in Table 3, which are based on aggregate scores instead of latent variables.

**Table 2**  
Model fit for the 1-factor and 2-factor solutions.

	$\chi^2$	df	$\chi^2/df$	CFI	RMSEA	SRMR
1-Factor multilevel model	204.82	108	1.90	0.890	0.048	W = 0.055, B = 0.082
2-Factor multilevel model	141.12	106	1.33	0.960	0.029	W = 0.043, B = 0.071
Null model	1013.77	132	7.68	–	0.131	W = 0.206, B = 0.539

Note. df = degrees of freedom. CFI = comparative fit index, RMSEA = root mean square error of approximation, BIC = Bayesian information criterion, SRMR = standardized root mean square residual, W = within-person portion, B = between-person portion.

the between-person level ( $r = 0.87, p < .001$ ) than at the within-person level ( $r = 0.68, p < .001$ ). Consistent with this finding, the factor loadings were generally higher at the between-person level than at the within-person level. The reason for this is that within-person variance is lost when variables are aggregated. That is, when aggregated scores are calculated, daily deviations are averaged out. For instance, the designing competition item “Today, I tried to set time records in my work tasks” had the lowest within-person factor loading, which suggests that responses to this item occasionally deviate from the responses to the other items measuring designing competition. However, when responses are aggregated across days, these deviations are averaged out, which makes the response pattern relatively more consistent with the other responses – which increases the factor loading.

## 5. Phase 1: Discussion

In line with our hypothesis, the findings indicate that similar to trait PWD, daily PWD consists of two dimensions, namely, (1) designing fun and (2) designing competition. The two-factor model revealed that designing fun and designing competition were inter-related, which reflects that they are part of the same latent construct (i.e., PWD). Interestingly, the factor loadings were generally higher at the between-person level than at the within-person level, suggesting that the enactment of the various *specific* PWD behaviors captured by the dimensions of (1) designing fun and (2) designing competition may vary from day to day – most likely as a function of the work activities on those days. This information is lost when daily measurement points are aggregated – which occurs at the between-person level. This may also explain why it is easier to discriminate between designing fun and designing competition at the within-person level than at the between-person level. Previous studies examining daily variations in self-management and daily job crafting have produced a similar

multilevel factor-analytic pattern (e.g., Breevaart et al., 2012; Petrou et al., 2012).

The designing competition item that refers to the use of time limits showed the lowest factor loading, which suggests that setting time limits may not be possible on every single day. This finding is most likely a result of the different work activities employees face from day to day. For example, when answering e-mails, setting a time-record is an option. However, when tasks are more protocolled or interdependent in nature (e.g., broadcasting live television as a newsreader or weatherman), this playful work design behavior may not be a realistic option. Nevertheless, the factor loading for this item (0.27 at the day level,  $p = .014$ ) was still significant and theoretically represents an important facet of agonistic play (i.e., Caillois, 1961; Csikszentmihalyi, 1975a; Suits, 1990). Taken together, the findings support (1) the validity of the *daily* version of the PWD scale – including the two factors of designing fun and designing competition – and (2) that we can empirically discriminate between designing fun and designing competition.

## 6. Phase 2: Daily playful work design and trait activation

In support of the factorial validity of the daily PWD instrument, the two-factor structure most accurately described fluctuations in PWD (Phase 1). Therefore, we can investigate the structural relationship of daily PWD with daily work engagement and creativity (Fig. 1).

### 6.1. Work engagement

Work engagement is a positive and fulfilling work-related state of mind characterized by vigor, dedication, and absorption (Schaufeli, Salanova, González-Romá, & Bakker, 2002) that fluctuates from day to day within the same person (Breevaart et al., 2012). Vigor refers to an individual's level of energy and

willingness to work hard. Dedication reflects the meaningfulness and enthusiasm employees derive from their work. Finally, absorption means that employees are fully immersed in their work and forget everything else around them. Through playfully designing fun and competition, employees create meaning, challenge, and enjoyment in their work (Csikszentmihalyi, 1975a; Huizinga, 1949), which likely promotes work engagement. While play in general is theoretically and empirically associated with activated positive affect (e.g., Csikszentmihalyi, 1975b; Lieberman, 2014), to our knowledge, there are no quantitative studies that investigate the relationship between self-initiated, work-related play (i.e., PWD) and work engagement. There are, however, anecdotal accounts that provide support that such a relationship exists.

Csikszentmihalyi (1975a) described how a sales representative and an assembly line worker playfully designed more competition in their work to proactively boost their work enjoyment. The sales representative framed work as a “clash of wits” and challenged himself to beat his opponent with “ruses and eloquence” (p. 47). The assembly line worker “approached his/her task in the same way an Olympic athlete approaches his/her match: How can I beat my record?” (p. 39). In a similar vein, Terkel (1974) describes how a supermarket checker and a restaurant server playfully designed more fun in their work to manage their work experience. The checker playfully danced while scanning groceries, which the checker viewed as “playing the piano” (p. 376), and the server served dishes as if (s)he was “a ballerina” (p. 394). These examples, taken together with research indicating that play and activated positive affect are interrelated (e.g., Guitard et al., 2005; Huizinga, 1949), suggest that employees are likely to become more engaged in their work when they use PWD. Therefore, we predict the following:

**Hypothesis 2.** Daily playful work design relates positively to daily work engagement.

## 6.2. Creativity

Creativity entails the production of novel and appropriate responses, products, or solutions (Amabile & Mueller, 2008). This creative process refers to an employee’s ability to use a nonrigid thinking style and think outside of the box (Amabile, 1983). This thinking style is tied with an individual’s emotional state. Whereas negative emotions narrow attentional focus and momentary thought-action repertoires, positive emotions broaden people’s cognitive scope (Fredrickson, 1998, 2001). Thus, individuals who experience intense fear channel all their attention and energy on a narrow set of behavioral options (e.g., fight or flight). In contrast, positive emotions such as joy and pride prompt people to explore, learn, and exhibit artistic behavior. In a similar vein, broadened cognition may promote creativity (Fredrickson & Branigan, 2005). Indeed, a lab study showed that students who watched a film inducing positive affect (i.e., funny film outtakes), compared to students who watched a film inducing negative affect (i.e., a short documentary about the Nazi’s), produced more creative solutions to a problem-solving task (Isen, Daubman, & Nowicki, 1987). Additionally, a diary study among interior architects showed that creativity was highest on days characterized by positive affect (Binnewies & Wörnlein, 2011). Work engagement is a type of work-related activated positive affect (Bakker & Oerlemans, 2011) that fluctuates on a daily basis (Breevaart et al., 2012). Accordingly, considering that creativity is a direct consequence of broadened cognition (Fredrickson & Branigan, 2005), work engagement and creativity should fluctuate in relative harmony. Since we expect that PWD enables employees to proactively foster their

work engagement on a daily basis, we suggest that daily PWD fosters the affective resources necessary for daily creativity. Therefore, we hypothesize the following:

**Hypothesis 3.** PWD is positively related to creativity through work engagement on a daily basis (indirect effect).

## 6.3. Trait activation theory

Trait activation theory (TAT) is a personality theory on employee functioning that integrates trait theory, situationism, and person-job fit theory (Tett & Guterman, 2000; Tett et al., 2013). TAT acts as the main theoretical foundation of the moderated-indirect effects model that we present in the current study (see Fig. 1). TAT proposes that employees especially enjoy work that fits their personality because of need satisfaction (Tett & Burnett, 2003). A central assumption is that employees have a tendency to show consistency in their thoughts, feelings, and actions, which originate from an employee’s more stable personal needs. TAT suggests that employees intrinsically enjoy conditions at work that satisfy those needs and will therefore seek out these situations (Tett & Burnett, 2003). We contribute to TAT by (1) investigating the intrinsic value of trait activation from a dynamic, within-person perspective among employees and (2) investigating whether employees may indeed proactively activate their own traits.

Accordingly, we employ a multilevel diary design to examine the intrinsic value of trait activation in terms of a cross-level moderation effect of personality on the relationship between daily PWD and work engagement. While we argue that the use of PWD is engaging to most employees, TAT suggests that PWD is especially likely to promote work engagement among employees with a personality that reflects a need for playful work, i.e., employees who are open to experiences and playful. Individuals who are open to experiences have an active imagination (Costa & McCrae, 1992) and a distaste for activities that lack challenge (Finn, 1997; Kraaykamp & Van Eijck, 2005). Moreover, open individuals have a tendency to enjoy affiliative and self-enhancing humor (Vernon, Martin, Schermer, & Mackie, 2008), which may stem from a need for variety and a strong need to enlarge their experiences (McCrae & Costa, 1997). In a similar vein, playful individuals have a tendency to reframe situations to seek entertainment, amusement, or stimulation (Barnett, 2007; Csikszentmihalyi, 1975a; Proyer, 2017). In addition, individuals who are playful have a strong motivation towards goal accomplishment (Hong et al., 2009), which may stem from a need for challenge (Csikszentmihalyi, 1975a; White, 1959).

In line with TAT, De Jong, Van Der Velde, and Jansen (2001) showed that employees who were higher (vs. lower) in openness to experiences were especially satisfied with their job when their work offered them a variety of tasks and various ways to use their skills. In a similar vein, a study among graduate students showed that gamers who scored higher (vs. lower) on playfulness experienced more enjoyment and immersion when they were confronted with challenges in the game than their less playful counterparts (Jin, 2012). While these studies contribute to our understanding of trait activation, they focus on between-person differences, whereas the intrinsic value of trait activation is inherently a dynamic, within-person process. Hence, the present study extends previous research by investigating whether open and playful employees may proactively activate their traits on a daily basis. We argue that when employees use PWD, they use imagination, framing, self-set goals, and humor to create an enlarged, more entertaining, challenging, and stimulating work experience, which fits the needs of employees who are open to experiences and

playful. Accordingly, open and playful employees may be more effective in proactively fostering the affective resources necessary for daily creativity through daily PWD. Therefore, we expect that:

**Hypothesis 4a.** Openness to experiences moderates the indirect effect of daily playful work design on daily creativity through work engagement. Specifically, the indirect effect will be stronger for individuals who are higher (vs. lower) in openness to experience.

**Hypothesis 4b.** Playfulness moderates the indirect effect of daily playful work design on daily creativity through work engagement. Specifically, the indirect effect will be stronger for individuals who are higher (vs. lower) in playfulness.

## 7. Phase 2: Method

### 7.1. Participants and procedure

For a complete description of participants and procedure, see Phase 1. Participants ( $N = 88$ ) first received an e-mail with a link to an online survey with questions regarding their personality (i.e., openness, playfulness) and demographics. Roughly one week later, participants received a daily diary survey at 4 PM over the course of five days. These surveys contained questions regarding employees' playful work design, work engagement, and creativity during that day.

### 7.2. Measures

The time frame of the daily measures was adapted so that they specifically referred to the past day, which is common practice in research that employs a diary design (Ohly et al., 2010). Reliability was good for all instruments (see Table 3).

**Openness to experiences** was measured with the five-item openness scale from the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991). An example item is, "I am someone who is curious about many different things" (1 = strongly disagree, 5 = strongly agree).

**Playfulness** was measured with the five-item short measure of playfulness (Proyer, 2012). An example item is "Good friends would describe me as a playful person" (1 = strongly disagree, 7 = strongly agree).

**Daily playful work design** was measured with the twelve-item Playful Work Design Scale that was described in Phase 1. We distinguished between (1) designing fun and (2) designing competition (1 = never, 5 = very often). An example item for designing fun is "Today, I used my imagination to make my job more interesting". An example item for designing competition is "Today, I tried to make my job a series of exciting challenges" (See Table 1 for all items).

**Daily work engagement** was measured with the nine-item Utrecht Work Engagement Scale (UWES; Breevaart et al., 2012; Schaufeli, Bakker, & Salanova, 2006). The UWES covers three dimensions, which are assessed with three items each (1 = never, 6 = always). Example items are "Today, I felt bursting with energy" (vigor), "Today, I was inspired by my job" (dedication), and "Today, I was immersed in my work" (absorption).

**Daily creative work performance** was measured with the four-item creativity scale developed by Miron, Erez, and Naveh (2004). An example item is, "Today, I had many creative ideas at work" (1 = totally disagree, 7 = totally agree).

### 7.3. Strategy of analysis

Multilevel modeling is warranted, since the 1-ICCs presented in Table 1 indicate that 30% to 44% of the variance in PWD, work engagement, and creativity is explained by differences within persons. Models with continuous latent variables as dependent variables require numerical integration in their computations (Muthén & Muthén, 1998–2017). As a consequence, fit statistics such as chi-square, CFI, RMSEA, and SRMR were unavailable when we performed our analyses (Hypotheses 2–4). Hence, we used the chi-square difference test based on the log-likelihood values and scaling correction factors (Satorra & Bentler, 2001) to compare models. For the purpose of convergence, we limited the number of free parameters by using total scores. However, since work engagement has three dimensions, it was modeled as a latent variable with three indicators (i.e., the mean scores vigor, dedication, and absorption). Finally, we grand-mean centered level-2 variables (i.e., playfulness and openness) and person-mean centered level-1 variables (i.e., PWD, work engagement, and creativity). Thus, when a level-1  $x$  variable (e.g., daily PWD) positively covaries with a level-1  $y$  variable (e.g., daily work engagement), this means that  $y$  is relatively higher on days where  $x$  is reported to be higher than a person's average score on  $x$ . In addition, when a level-2  $z$  variable (e.g., openness) is a moderator, then the aforementioned level-1 relationship either weakens or strengthens when  $z$  decreases or increases relative to the sample's average on  $z$  (Ohly et al., 2010).

## 8. Phase 2: Results

### 8.1. Descriptive statistics

Table 3 presents the means, standard deviations, reliabilities, 1-ICCs, and correlations of the study variables.

### 8.2. Multilevel structural equation modeling

We hypothesized that PWD would foster work engagement on a daily basis (Hypothesis 2) and that daily work engagement would act as the underlying mechanism that explains the relationship

**Table 3**  
Means, standard deviations, reliabilities (on the diagonal between brackets), and intercorrelations of the study variables.

	Mean	SD	1-ICC	1.	2.	3.	4.	5.	6.
1. Openness to experience	3.97	0.81	–	(0.78)					
2. Playfulness	4.61	1.22	–	0.16	(0.86)				
3. Designing fun	2.86	0.83	0.30	0.13	0.44 <sup>**</sup>	(0.82 – 0.88)	0.65 <sup>***</sup>	0.43 <sup>***</sup>	0.60 <sup>***</sup>
4. Designing competition	2.82	0.78	0.34	0.17	0.21	0.73 <sup>***</sup>	(0.72 – 0.81)	0.46 <sup>***</sup>	0.45 <sup>***</sup>
5. Work engagement	4.40	1.24	0.35	0.20	0.16	0.46 <sup>***</sup>	0.48 <sup>***</sup>	(0.91 – 0.95)	0.62 <sup>***</sup>
6. Creativity	3.49	1.36	0.44	0.30 <sup>**</sup>	0.24 <sup>**</sup>	0.67 <sup>***</sup>	0.49 <sup>***</sup>	0.61 <sup>***</sup>	(0.87 – 0.94)

Note. Person-level data ( $N = 88$ ) below the diagonal and day-level data above the diagonal ( $N = 391$ ). Correlations between person-level and day-level variables were calculated using the aggregate of the day-level. The 1-ICC refers to the within-person variance of the study variable.

\* $p \leq 0.05$ .

\*\* $p \leq 0.01$ .

\*\*\* $p \leq 0.001$ .

**Table 4**  
Multilevel estimates for models estimating daily creativity as the dependent variable (N = 88, N = 391 occasions).

Level and Variable	Direct effects model (Model 1)		Direct effects model (Model 2)		Indirect effects model (Model 3)			
	Daily Work Engagement		Daily Creativity		Daily Work Engagement		Daily Creativity	
	<i>b</i> <sup>*</sup> (SE)	<i>b</i> (SE)	<i>b</i> <sup>*</sup> (SE)	<i>b</i> (SE)	<i>b</i> <sup>*</sup> (SE)	<i>b</i> (SE)	<i>b</i> <sup>*</sup> (SE)	<i>b</i> (SE)
<b>Level 1</b>								
Intercept	—	—	4.90 <sup>***</sup> (0.41)	4.51 <sup>***</sup> (0.09)	—	—	4.40 <sup>***</sup> (0.40)	4.51 <sup>***</sup> (0.09)
Daily Designing fun	0.32 <sup>***</sup> (0.08)	0.48 <sup>***</sup> (0.14)	0.17 <sup>***</sup> (0.05)	0.35 <sup>***</sup> (0.10)	0.32 <sup>***</sup> (0.08)	0.51 <sup>***</sup> (0.15)	0.09 (0.60)	0.20 (0.13)
Daily Designing competition	0.31 <sup>***</sup> (0.08)	0.50 <sup>***</sup> (0.14)	0.11 (0.06)	0.22 (0.12)	0.30 <sup>***</sup> (0.08)	0.53 <sup>***</sup> (0.14)	0.03 (0.06)	0.07 (0.13)
Daily Work Engagement			0.64 <sup>***</sup> (0.07)	0.68 <sup>***</sup> (0.12)			0.66 <sup>***</sup> (0.08)	0.86 <sup>***</sup> (0.15)
<b>Variance Components</b>								
Within-person variance ( $\sigma^2$ )	0.71 <sup>***</sup> (0.09)	0.29 <sup>**</sup> (0.10)	0.53 <sup>***</sup> (0.07)	0.37 <sup>***</sup> (0.05)	0.72 <sup>***</sup> (0.09)	0.33 <sup>**</sup> (0.10)	0.47 <sup>***</sup> (0.06)	0.36 <sup>***</sup> (0.05)
Intercept variance ( $\tau_{00}$ )	0.77 <sup>***</sup> (0.11)	0.52 <sup>**</sup> (0.15)	0.49 <sup>***</sup> (0.08)	0.42 <sup>**</sup> (0.09)	0.77 <sup>***</sup> (0.11)	0.51 <sup>**</sup> (0.15)	0.40 <sup>***</sup> (0.08)	0.42 <sup>***</sup> (0.15)
<b>Additional information</b>								
–2 log likelihood		–1520.59		–2040.06				–1988.01
Scaling correction factor for MLR		2.31		2.12				1.92
$\Delta$ –2 log likelihood								119.65 <sup>***</sup>
Degrees of freedom		16		21				25

Note. *b*<sup>\*</sup> = standardized coefficient; *b* = unstandardized coefficient. L1 = Level 1; L2 = Level 2. MLR = maximum likelihood estimation with robust standard errors.

\**p* ≤ 0.05.

\*\**p* ≤ 0.01.

\*\*\**p* ≤ 0.001.

between daily PWD and daily creativity (Hypothesis 3). In line with Hypothesis 2, Table 4 shows that daily designing fun (*b* = 0.50, *SE* = 0.14, *p* = .001, 95% CI [0.22, 0.78]; Model 1) and competition (*b* = 0.48, *SE* = 0.14, *p* = .001, 95% CI [0.21, 0.76]; Model 1) were both positively associated with daily work engagement. In other words, employees were especially engaged on the days they playfully designed their work.

Next, we tested whether daily PWD was associated with daily creativity through daily work engagement (Hypothesis 3). The direct effects model showed that work engagement was positively associated with creativity (*b* = 0.68, *SE* = 0.12, *p* < .001, 95% CI [0.45, 0.90]; Model 2) and that while daily designing fun was positively associated with daily creativity (*b* = 0.35, *SE* = 0.10, *p* = .001, 95% CI [0.15, 0.56]; Model 2), daily designing competition was not (*b* = 0.22, *SE* = 0.05, *p* = .065, 95% CI [0.22, 0.78]; Model 2). The indirect effects model (Model 3), however, more accurately described the data than the direct effects model ( $\Delta$ –2 log likelihood = 119.65, *p* < .001). This model showed that while designing fun (*b* = 0.20, *SE* = 0.13, *p* = .119) and competition (*b* = 0.07, *SE* = 0.13, *p* = .579) were not directly related to creativity, daily designing fun (indirect *b* = 0.45, *SE* = 0.15, *p* = .003, 95% CI [0.16, 0.75]) and competition (indirect *b* = 0.43, *SE* = 0.13, *p* = .001, 95% CI [0.11, 0.68]) were each indirectly associated with daily creativity through daily work engagement. Thus, in support of Hypothesis 3, employees were most creative on the days they playfully designed their work more than usual (i.e., averaged over five workdays) because they were more engaged with their work.

Hypothesis 4 states that the relationship between daily playful work design and daily work engagement will be moderated by individual differences in (a) openness and (b) playfulness. Before testing these hypotheses, we first tested the amount of slope variance ( $\tau_{11}$ ) in the relationship between daily playful work design and daily work engagement (Table 5). While there was variation between employees in the relationship between daily designing fun and daily work engagement ( $\tau_{11}$  = 0.34, *SE* = 0.15, *p* = .023; Model 1), the amount of between-person variation in the relationship between daily designing competition and daily work engagement was not significant ( $\tau_{11}$  = 0.08, *SE* = 0.13, *p* = .535; Model 1). However, LaHuis and Ferguson (2009) “strongly recommend against using significant slope variance as a prerequisite for testing hypothesized cross-level interactions” because slope variance tests suffer from lower power (Snijders & Bosker, 1999) than the

estimation of fixed effects (Hox, Moerbeek, & Van de Schoot, 2017). We therefore follow the recommendation to proceed to test the cross-level interactions (Aguinis, Gottfredson, & Culpepper, 2013).

Next, we simultaneously tested the four cross-level interactions (Table 5; Model 2). Contrary to our expectations, openness to experiences did not moderate the relationship between daily designing competition and daily work engagement (*b* = –0.01, *SE* = 0.12, *p* = .979; Model 2), and playfulness did not moderate the relationship between daily designing fun and daily work engagement (*b* = –0.04, *SE* = 0.08, *p* = .130; Model 2). These interaction terms were therefore not retained in the final moderated-mediation model (Model 3). The final moderated-mediation model indicates that openness to experiences moderated the relationship between daily designing fun and daily work engagement (*b* = 0.34, *SE* = 0.12, *p* = .006, 95% CI [0.10, 0.58]; Model 3). The simple slope analysis revealed that daily designing fun fostered daily work engagement for employees higher (+1SD) in openness to experiences (*b* = 0.71, *SE* = 0.14, *p* < .001, 95% CI [0.43, 0.99]) but not for employees lower (–1SD) in openness to experiences (*b* = 0.15, *SE* = 0.14, *p* = .262), which is illustrated in Fig. 2. In a similar vein, playfulness moderated the relationship between daily designing competition and work engagement (*b* = 0.18, *SE* = 0.08, *p* = .019, 95% CI [0.03, 0.33]; Model 3). The simple slope analysis revealed that daily designing competition fostered daily work engagement for employees higher (+1SD) in playfulness (*b* = 0.65, *SE* = 0.13, *p* < .001, 95% CI [0.39, 0.91]) but not for employees lower (–1SD) in playfulness (*b* = 0.21, *SE* = 0.14, *p* = .114), which is illustrated in Fig. 3.

We found partial support for our proposed moderated-indirect effects model (Hypothesis 4). The moderated-indirect effects followed the pattern found for the cross-level interactions. Namely, while daily designing fun was indirectly associated with daily creativity through daily work engagement for employees higher in openness to experiences (indirect *b* = 0.66, *SE* = 0.17, *p* < .001, 95% CI [0.32, 0.99]), it was not for employees lower in openness to experiences (indirect *b* = 0.14, *SE* = 0.13, *p* = .276). In a similar vein, while daily designing competition was indirectly associated with daily creativity through daily work engagement for employees who scored higher (+1SD) in playfulness (indirect *b* = 0.60, *SE* = 0.13, *p* < .001, 95% CI [0.35, 0.85]), it was not for employees who scored lower (–1SD) in playfulness (indirect *b* = 0.20, *SE* = 0.12, *p* = .112). Hence, Hypothesis 4 was partially supported.

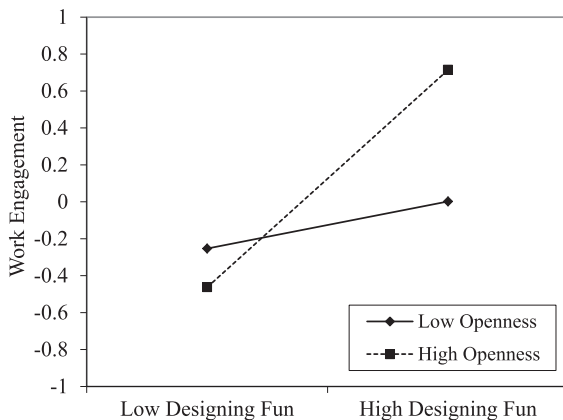


**Table 5**  
Multilevel estimates for models estimating daily creativity as the dependent variable (N = 88, N = 391 occasions).

Level and Variable	Indirect effects model with random slope (Model 1)		Cross-level moderated-Indirect effect (Model 2)		Cross-level moderated-Indirect effect (Model 3)	
	Daily Work Engagement <i>b</i> (SE)	Daily Creativity <i>b</i> (SE)	Daily Work Engagement <i>b</i> (SE)	Daily Creativity <i>b</i> (SE)	Daily Work Engagement <i>b</i> (SE)	Daily Creativity <i>b</i> (SE)
<b>Level 1</b>						
Intercept	—	4.51*** (0.09)	—	4.51*** (0.09)	—	4.51*** (0.09)
Daily Designing Fun	0.46*** (0.10)	0.20 (0.12)	0.43*** (0.10)	0.17 (0.13)	0.43*** (0.10)	0.17 (0.13)
Daily Designing Competition	0.42*** (0.11)	0.06 (0.13)	0.43*** (0.10)	0.03 (0.13)	0.43*** (0.10)	0.03 (0.13)
Daily Work Engagement		0.90*** (0.14)		0.92*** (0.14)		0.92*** (0.14)
<b>Level 2</b>						
Openness			0.16 (0.10)		0.16 (0.10)	
Playfulness			-0.04 (0.08)		-0.03 (0.08)	
<b>Cross-level interaction</b>						
Daily Designing Fun × Openness			0.34** (0.12)		0.34** (0.12)	
Daily Designing Fun × Playfulness			0.02 (0.09)		—	
Daily Designing Competition × Openness			-0.01 (0.12)		—	
Daily Designing Competition × Playfulness			0.18* (0.07)		0.18* (0.08)	
<b>Variance Components</b>						
Within-person variance ( $\sigma^2$ )	0.18** (0.06)	0.36*** (0.05)	0.18** (0.06)	0.34*** (0.05)	0.18** (0.06)	0.34*** (0.05)
Intercept variance ( $\tau_{00}$ )	0.54*** (0.14)	0.42*** (0.09)	0.53*** (0.15)	0.43*** (0.09)	0.53*** (0.15)	0.43*** (0.09)
Slope variance ( $\tau_{11}$ )	0.34* (0.15)		0.27 (0.14)		0.27 (0.14)	
Slope variance ( $\tau_{12}$ )	0.08 (0.13)		0.06 (0.10)		0.06 (0.10)	
Intercept-slope covariance ( $\tau_{01}$ )	-0.20** (0.08)		-0.25*** (0.08)		-0.25*** (0.08)	
Intercept-slope covariance ( $\tau_{02}$ )	-0.06 (0.05)		-0.06 (0.05)		-0.04 (0.05)	
<b>Additional information</b>						
-2 log likelihood		-1963.65		-1954.26		-1954.29
Scaling correction factor for MLR		1.52		1.42		1.45
$\Delta$ -2 log likelihood		180.44***		21.59**		-0.07
Degrees of freedom		33		39		37

Note. L1 = Level 1; L2 = Level 2. MLR = maximum likelihood estimation with robust standard errors. Only unstandardized coefficients (*b*) are reported because Mplus does not provide standardized coefficients for models with random slopes.

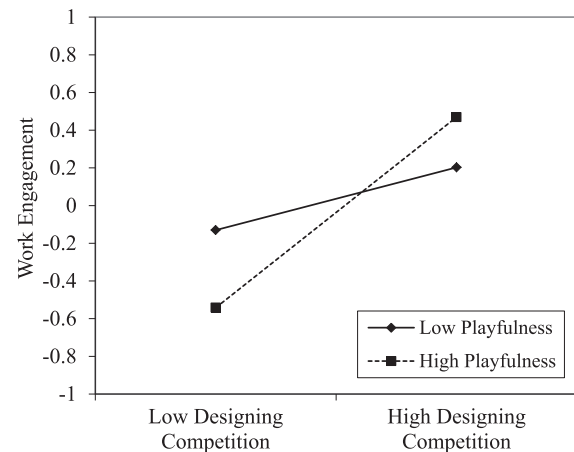
\*  $p \leq 0.05$ .  
\*\*  $p \leq 0.01$ .  
\*\*\*  $p \leq 0.001$ .



**Fig. 2.** Openness to experiences moderates the relationship between daily designing fun and daily work engagement.

### 8.3. Power analyses

At this point, we would like to briefly reflect on the statistical power of our study. Since many different parameters determine the power to detect significant relationships among multilevel studies, it remains a controversial topic that enjoys a lot of debate (Hox et al., 2017; Mehl & Conner, 2011). We therefore conducted post hoc power analysis with Monte Carlo simulations following the procedure of Mathieu, Aguinis, Culpepper, and Chen (2012). The analyses revealed that given the effect sizes and sample size the power to detect the hypothesized cross-level interactions was greater than 0.98, which is similar to other studies with



**Fig. 3.** Playfulness moderates the relationship between daily designing competition and daily work engagement.

similar parameters and sample sizes (e.g., Mabbe et al., 2018; Wickham, Williamson, Beard, Kobayashi, & Hirst, 2016). Hence, the power of the study to detect the hypothesized relationships was sufficiently high.

## 9. Discussion

Our findings indicate that personality plays an important role in optimal functioning at work. Partially supporting trait activation

theory (Tett et al., 2013), employees whose personalities matched with their proactively designed work environment were especially engaged and creative at work. That is, playfully designing fun from day to day fostered daily work engagement and creativity particularly for employees who were more (vs. less) open to experiences and playfully designing competition for employees who were more (vs. less) playful. From a TAT perspective, these findings suggest that daily designing fun and competition foster the volatile resources necessary for creative performance especially when they satisfy employees' personal needs.

## 10. General discussion

The main goal of the current study was to investigate how individual differences affect the relationship of playful work design (PWD) with daily work engagement and creativity. For this purpose, we build on trait activation theory (TAT; Tett et al., 2013) to argue that PWD leads to daily work engagement and creativity particularly for employees who are more (vs. less) open to experiences and playful. Our findings support the principle of trait activation for the trait of openness and the trait of playfulness when employees designed fun (e.g., by trying to see the humor in work events and using fantasy to frame work) and designed competition (e.g., by trying to set time records within tasks and competing with past performance), respectively.

Our study is unique in several ways. First, we introduced PWD as a new daily proactive-cognitive-behavioral work orientation, which enables employees to proactively boost their well-being. Second, we proposed and validated the daily measurement of PWD. Third, we tested whether the predictions of TAT hold for work conditions that are proactively shaped by the employee. We showed that the interrelationship of play with positive affect (i.e., work engagement) and creativity also exists in the workplace on a daily basis and that this relationship is affected by individual differences in openness and playfulness. Taken together, these findings shed light on and stimulate further research into the role of PWD and personality in daily optimal functioning at work.

### 10.1. Theoretical implications

While play is an essential component of human culture (Huizinga, 1949), little is known about how it affects work (Mainemelis & Ronson, 2006). The current study contributes to our understanding of work-related, self-initiated play defined as PWD. Our findings indicate that employees proactively foster their work engagement on a daily basis by making their experience of work more playful. That is, employees proactively fostered their daily energy, enthusiasm, and focus through integrating humor in tasks, using imagination to frame their work, approaching tasks as exciting challenges, and competing with themselves (i.e., designing fun and competition). Importantly, daily work engagement subsequently predicted daily creativity at work. The present study is therefore the first to directly investigate how employees may proactively alter their daily experience of work and boost their creativity by imposing experiential qualities of play on their tasks.

We introduced and validated the daily measurement of PWD. Research has called for valid instruments to capture play at work (Petelczyc et al., 2018). Our findings show that the adapted instrument adequately describes and captures fluctuations in PWD. The findings also revealed that the two PWD factors (i.e., designing fun and designing competition) were closely related, which supports the contention that they are part of the same latent construct (i.e., PWD). While the factors were interrelated at both the between- and within-person levels, the instrument distinguishes

daily designing fun from daily designing competition. This is important because the dimensions of PWD may hold distinct associations with outcome variables. In support of this idea, our study shows that while openness to experiences only moderated the relationship between daily designing fun and work engagement, playfulness only moderated the relationship between daily designing competition and work engagement, which provides initial support for the discriminant validity of the two dimensions.

We showed that trait activation theory (TAT) is a suitable framework to study work that is proactively designed by employees themselves. The principle of trait activation was supported for employees with higher (vs. lower) openness to experiences who designed fun and employees with higher (vs. lower) playfulness who designed competition. Our findings make two major contributions to our understanding of the intrinsic value of trait expression (Tett et al., 2013). First, we extend previous research that investigates TAT from a between-person perspective (e.g., Christiansen, Sliter, & Frost, 2014; Hochwarter, Witt, Treadway & Ferris, 2006) by using a cross-level, daily diary design to show that the intrinsic value of trait activation is a dynamic, within-person process. Second, TAT suggests that employees will seek out situations that stimulate trait expression because these situations are intrinsically rewarding (Tett et al., 2013). The current study provides initial support for this claim by showing that employees proactively activate their traits on a daily basis.

Unexpectedly, however, there was no evidence of trait activation for employees higher (vs. lower) in openness to experiences who designed competition or for employees higher (vs. lower) in playfulness who designed fun. We can only speculate as to why this was the case. Possibly, there is a mismatch in the main focus of designing fun and designing competition with the personal needs of open and playful employees, respectively. Namely, designing competition may not cater to the need for variety of employees higher in openness to experiences (Costa & McCrae, 1997) because it primarily focuses on a single skill – the task skill. For instance, a journalist who designs competition by challenging him/herself to avoid the reuse of certain adverbs stretches his/her task-skill (i.e., writing) to meet this goal but will not necessarily use a wider variety of skills. In a similar vein, it is possible that designing fun does not satisfy the need for challenge of employees high in playfulness (Csikszentmihalyi, 1975a) because it primarily makes the experience of work more entertaining by increasing the variation in cognition, skill use, and social interactions (Scharp et al., 2018; Lieberman, 2014). For instance, when an accountant designs fun by using his/her fantasy to picture the information from each invoice as a movie, every invoice becomes a new, interesting, developing story. While this may make work more entertaining and varied, it does not necessarily make work more challenging.

Finally, our findings extend previous experimental and qualitative studies, as well as studies among students suggesting that play is interrelated with positive affect and creativity (e.g., Csikszentmihalyi, 1975a; Guitard et al., 2005; Lieberman, 2014; Russ et al., 1999; Vandenberg, 1980). Namely, we showed that these relationships persist on a daily basis in the context of work. Moreover, since we focused on *self-initiated* play, our findings suggest that employees may proactively stimulate their creativity on a daily basis by fostering work engagement with PWD. When employees experience positive emotions, their attention and thoughts become flexible, which promotes integration of, and openness to, new information – which is essential for creativity (Fredrickson, 2001, 2003). In other words, by fostering work engagement, PWD seems to enable a thinking style that is conducive to creativity. Importantly, our model considers personality as a boundary condition of this indirect relationship. Namely, employees who were more (vs. less) open and more (vs. less)

playful were particularly apt to manage their creativity through designing fun and competition, respectively. These findings contribute to a more dynamic understanding of the nomological net of daily creativity.

### 10.2. Practical implications

While more research is needed on PWD and its boundary conditions, our findings have several implications for practice. PWD appears to be an accessible, effective method for employees to foster their daily work engagement and creativity. From the perspective of the employee, our findings suggest that employees should design their work to be playful particularly on days that would benefit from higher levels of work engagement or creativity. For instance, an employee who has a group meeting every Thursday that revolves around exchanging creative ideas may especially benefit from PWD on this weekday. Likewise, when a work day is characterized by a less engaging work activity such as answering e-mails, employees may ameliorate their work engagement by playfully designing their work by, for example, striving to create challenges or beat time records.

Employers may seek to promote PWD by providing (digital) training or workshops. Training may focus on building knowledge, practicing PWD, exchanging past PWD experiences, and goal-setting. Specifically, training should first promote conceptual knowledge of what PWD constitutes and how PWD is applied to work. To consolidate learning, trainees may subsequently (1) practice PWD (e.g., "How would you apply PWD to sending emails?") and (2) share personal PWD experiences (Bandura, 1989). Finally, to motivate actual PWD at work, trainees should set realistic, specific goals for the future (Gollwitzer, 1999). Importantly, our findings suggest that in these workshops, personality assessments may be used for a more tailored approach. While more research is needed on how personality influences the effectiveness of bottom-up initiatives, the current research suggests that personality may act as an important boundary condition for the effectiveness of proactive work behaviors aimed at enhancing person-job fit. Practitioners may therefore use personality assessments to guide more tailored bottom-up interventions.

PWD interventions may complement or act as an effective, low-cost alternative to top-down initiatives to promote employee work engagement and creativity for several reasons. First, top-down job redesign is a popular, but costly, method for enhancing work engagement and creativity, which implies that not all employers will have or use the financial resources for such job redesign. Second, top-down job redesign limits individualization by using a 'one-size fits all' approach. Yet, our study indicates that individual differences determine the effectiveness of redesign initiatives. That is, PWD was less successful in fostering daily work engagement for employees lower (vs. higher) in openness and playfulness. PWD interventions avoid these pitfalls as they allow individual employees to choose themselves whether to implement PWD as a work strategy and may therefore complement or act as a viable alternative to top-down work design initiatives.

### 10.3. Limitations and implications for future research

Like most research, our study is not without limitations. First, all of our measures were self-reported measures, which may induce common method bias. However, through person-centering the level-1 predictors in our models, we controlled for some of the causes of common method bias, such as the participant's general response tendency and general affectivity (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Moreover, cross-level interactions become more difficult to detect when common method variance is an issue (Lai, Li, & Leung, 2013). Therefore,

the cross-level moderation effects make the presence of common method variance bias less likely. Conceptually, positive affect may be considered a third variable explaining common method variance in the current study. Yet, positive mood is more likely a theoretically important contributing factor of the relationships that we find, rather than a contaminating factor. That is, positive affect that may result from PWD broadens the cognitive capacity to become more engaged and also to be more creative (i.e., broaden-and-build theory; Fredrickson, 1998, 2001). While behavior as idiosyncratic as PWD and states as personal as work engagement are best assessed through self-ratings, future research may replicate these findings using an objective measure of performance in creative jobs (e.g., art, writing, musical composition).

Second, the current study does not allow us to infer causality. However, research with students has shown that intrinsic motivation was highest in the condition that labeled tasks as play as opposed to work (Glynn, 1994). Furthermore, in a series of experimental studies, students were most creative in the conditions that induced positive affect (Isen et al., 1987). Taken together, these previous studies offer some evidence for the temporal ordering of our variables. Nevertheless, reversed causal relationships may simultaneously exist. This is in line with research that argues that energetic resources are a precondition for any goal-directed behavior (Hobfoll, 2002; Shirom, 2007)—such as play. Hence, future research may explore reciprocal relationships.

Third, while we did not measure cognitive capacity and job characteristics (e.g., task variety, workload), these factors may influence the initiation and effectiveness of PWD. On the one hand, PWD may act as additional cognitive load because it requires the employee to find opportunities for play in work. On the other hand, work-settings characterized by factors such as work underload may understimulate employees. These factors may determine to what extent an employee has 'room' for PWD and how beneficial PWD is. For instance, it is conceivable that especially individuals with a high cognitive capacity will strive for additional stimulation through PWD when they encounter unchallenging and unvaried work settings. Additionally, designing competition may be especially beneficial in unchallenging work settings, since it creates a more challenging work experience. Likewise, designing fun may especially benefit those working in a setting that lacks variation, since it creates a more varied work experience. Future research should therefore investigate to what extent cognitive capacity and job characteristics influence the effectiveness of playful work design.

Fourth, while the factor structure of the playful work design scale was previously explored and cross-validated in a cross-sectional design (Scharp et al., 2018), the current study represents the first use of its adapted daily counterpart. Testing the factorial validity of a scale and answering content-related questions utilizing the same sample is not ideal. While this procedure is in accordance with previous research (e.g., Petrou et al., 2012), future research should aim to replicate the multilevel factorial structure of the PWD scale in independent samples.

Many forms of play represent goal-directed behavior (Csikszentmihalyi, 1997). Hence, playful work design as a concept bears resemblance with goal-setting (Locke & Latham, 1990).<sup>1</sup> Studying playful work design, and designing competition in particular, may therefore be a fruitful avenue for goal-setting theory researchers. For instance, daily designing competition may reflect the behavior that explains the association between the trait of conscientiousness and daily work performance.

While research on self-initiated work strategies is inherently individualistic, little is known about the role of individual

<sup>1</sup> We thank one of the anonymous reviewers for raising this issue.

differences. Understanding the role of personality, however, makes for more accurate theoretical and practical implications. To our knowledge, the current study is one of the few studies that investigate the cross-level influence of personality on daily proactive work strategies. Future research employing cross-level, diary designs is therefore crucial to extend our knowledge on which proactive work strategies work for which employees. Moreover, our findings raise the question of which proactive work strategies benefit employees who are less (vs. more) open and playful. Do these employees flourish when proactive behavior meets their need for less variety and challenge? Future research may build on the current methodology to answer these questions, which may help to increase our understanding of the role of personality in daily proactive work strategies.

## 11. Conclusion

The current study introduced and validated the daily measurement of playful work design (PWD). Our findings suggest that employees who playfully design their work foster their daily work engagement and creativity. In addition, in line with trait activation theory (TAT; Tett et al., 2013), we argued and found that PWD promotes creativity through work engagement particularly for employees whose personalities reflect a need for such bottom-up job design. While designing fun worked best for individuals higher (vs. lower) in openness, designing competition worked best for individuals higher (vs. lower) in playfulness. Thus, while people are generally “most human, whole, free, and creative when they play” (Csikszentmihalyi, 1975b, p. 42), personality plays an important role. Hence, if we want to effectively stimulate optimal functioning in the workplace, we need to match employees’ personalities with their behaviors.

## Open practices

Data and data analysis scripts are provided at [osf.io/n9p28](https://osf.io/n9p28). The study was not preregistered.

## Contribution note

The first author collected and analyzed the data. The first, second, and third author were involved in interpreting the findings. All authors contributed to the study design and writing of the manuscript.

## Declaration of Competing Interest

None of the authors have competing interests to declare.

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