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# Playful work design and employee work engagement: A self-determination perspective

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ABSTRACT

Drawing on self-determination and play theories, we develop a process model that proposes that daily playful work design (PWD; designing fun, designing competition) positively relates to employees' daily work engagement through basic psychological need satisfaction. A total of 162 Dutch employees filled out short surveys at the end of each workday for 2–5 days (603 observations). As hypothesized, employees were more engaged on the days they designed their work to be more playful, which was explained by the satisfaction of their needs for autonomy, relatedness, and competence. Moreover, as expected, designing fun and designing competition differed in how and why they related to work engagement. In addition, we found that daily PWD was related to same-day, but not next-day need satisfaction and work engagement. Most path coefficients were statistically invariant across levels of analysis (between- vs. within-person levels), suggesting their meaning and function is equivalent across levels. However, additional analyses revealed synergetic effects between overall use of designing fun and designing competition. These findings expand self-determination and play theories by revealing how and why a proactive and playful approach to work activities and relationships fosters work engagement.

Play is a universally enjoyable phenomenon enacted in various domains (Huizinga, 1949). Perhaps reflecting the current Zeitgeist in positive organizational psychology (Bakker & Schaufeli, 2008; Donaldson et al., 2019), interest in play at work to enhance employee engagement and performance is gaining momentum (e.g., Celestine & Yeo, 2021; Petelczyc et al., 2018). Imagine a programmer who frames coding tasks as exciting puzzles, a service employee who exchanges humor with clients, or a bus driver who challenges him/herself to drive with the least number of sudden decelerations. Through play, a difficult programming task such as optimizing code no longer represents a long, tedious task but instead becomes an interesting, novel deciphering challenge. Similarly, playfully approaching and performing conversations with clients or bus rides may change their performative nature and instead shift focus to – and create – intrinsically enjoyable qualities. These instances exemplify "playful work design". By approaching and performing their tasks as opportunities for play, these employees transform the experiential qualities of their work activities.

Playful work design (PWD) offers a bottom-up perspective on the integration of play with work. When employees playfully design their work, they use play during tasks to make their work activities more fun or more competitive (Bakker, Scharp, et al., 2020; Scharp et al., 2019). Recently, research has revealed that on days when employees playfully design work, they tend to engage more with their work, have more creative ideas, and perform better (Bakker, Hetland, et al., 2020; Scharp et al., 2019). Moreover, when employees

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design their work to be more playful, they are more effective in dealing with adverse conditions such as hindrance stressors and rumination about the COVID-19 crisis (Bakker & van Wingerden, 2021; Scharp, Breevaart et al., 2021).

While a growing body of evidence shows that PWD relates to enhanced well-being, the goal of the present study is to explain *how*, *why,* and *when* PWD promotes and protects well-being. We build on self-determination theory (SDT;Deci et al., 2017 ; Deci & Ryan, 2000) and multilevel theories (Chen et al., 2005; Xanthopoulou & Bakker, 2021) to develop an intra- and interindividual process model to elucidate why PWD fosters vigor, enthusiasm, and absorption (i.e., work engagement). We propose that PWD promotes need satisfaction and work engagement across levels of analysis (Deci & Ryan, 2000; Deci et al., 2017; see Fig. 1). Moreover, our research highlights that the specific dimensions of PWD, designing fun and designing competition, differ in how and why they foster work engagement. We argue that designing fun and designing competition both instill a sense of volition and ownership (i.e., satisfy the need for autonomy), but that designing fun specifically fosters a sense of belongingness and connectedness (i.e., relatedness), whereas designing competition specifically promotes the experience of achievement and efficacy (i.e., competence). Furthermore, we investigate the transient nature of daily PWD by examining whether the associations with need satisfaction and work engagement pertain to the same as well as the next workday. Finally, we assess whether PWD manifests itself in equivalent ways when we compare situations (differences between days) with individuals (differences between persons). By testing intra- and interindividual processes simultaneously in a multilevel model, findings may reveal equivalence or discrepancies between associations across levels of analysis. For instance, an individual may feel relatively more autonomous on days they design fun in comparison with other weekdays (within-person differences) but may not differ from their less playful counterpart in their average level of satisfaction of the need for autonomy (between-person differences). While multilevel investigations regarding the generalizability of processes across levels are rare (Xanthopoulou & Bakker, 2021), this example illustrates we cannot assume equivalence of coefficients across levels of analysis. Indeed, "scholars must consider how research generalizes across levels" (Chen et al., 2005, p. 375).

Our research contributes to the literature in four significant ways. First, we expand the literature on SDT. Although SDT postulates that individuals may proactively satisfy their psychological needs, previous research has mainly studied how the environment nurtures the satisfaction of basic needs (cf. Bakker & van Woerkom, 2017). That is, research has mainly considered how certain environmental conditions such as job characteristics satisfy employees' basic needs. Thus, while ample research has been dedicated to studying how external factors cultivate basic need satisfaction (van den Broeck et al., 2016), scant research has studied what employees can actually do themselves to nurture their basic needs (Bakker & van Woerkom, 2017; Bakker & Oerlemans, 2019).

Second, we contribute to the literature on PWD by developing an understanding of how and why designing fun and designing competition foster work engagement across levels. Therefore, the present study may elucidate the mechanisms that explain previous findings such as why PWD especially benefits well-being for certain individuals (Scharp et al., 2019), reduces the negative

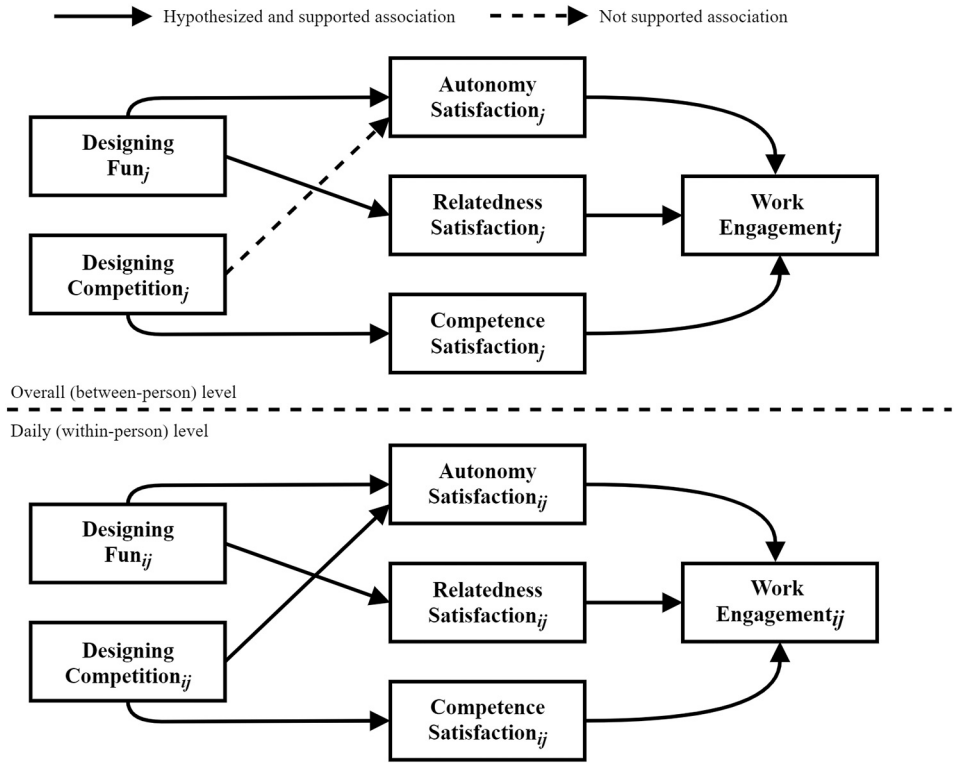


**Fig. 1.** Path diagram identifying the proposed and detected relations between the variables of the mediation model.
*Note.* $j$ = individual; $i$ = daily.

consequences of certain hindrance job demands (Scharp, Breevaart, et al., 2021), benefits in-role performance when time pressure is low (Bakker, Hetland, et al., 2020), and mitigates the impact of rumination about COVID-19 on depressive symptoms (Bakker & Van Wingerden, 2021).

Third, while theory suggests play is a transient phenomenon that operates within a specific timeframe (Huizinga, 1949; Mainemelis & Ronson, 2006), scant empirical research investigated the temporality of play. Indeed, in a review of the literature, Petelczyc et al. (2018) argue "Although a variety of outcomes have been examined as consequences of play, little attention has focused on whether these outcomes occur immediately or are more delayed and occur in the long term" (p. 179). We investigate to what extent PWD predicts same-day as well as next-day need satisfaction and work engagement, which advances knowledge about the day-to-day dynamics of play.

Finally, by developing a two-level process model and assessing the equivalence of the proposed associations across levels of analysis, we answer calls for multilevel research on play, need satisfaction, and work engagement (Brown & Ryan, 2007; Petelczyc et al., 2018; Xanthopoulou & Bakker, 2021). The findings may add to the parsimony in theory regarding how the processes operate or reveal that additional theorizing is warranted.

## 1. Theoretical background

### 1.1. Self-determination theory

SDT is a macro theory about the drivers of human motivation (Deci et al., 2017; Deci & Ryan, 2000). This theory is rooted in the premise that humans have a natural inclination towards psychological growth, integration, and well-being (Deci & Vansteenkiste, 2004). Whether individuals actualize their natural inclinations depends on the satisfaction of the basic psychological needs for autonomy, relatedness, and competence. Individuals are motivated by, and drawn to, experiences of self-determination, volition (autonomy), a sense of belonging, genuine connection (relatedness), feeling capable, and achieving success (competence; Deci & Ryan, 2000). The SDT conceptualizations of the need for autonomy and competence differ from related concepts in the organizational psychology literature. Namely, while job autonomy is often equated to decision latitude and job competence to proficiency (Hackman & Oldham, 1976; Morgeson & Humphrey, 2006), SDT defines the satisfaction of the need for autonomy and competence as essential psychological nutriments for ongoing psychological growth and well-being (Deci & Ryan, 2000). Thus, while these constructs are related, they are distinct. For instance, meta-analytic analyses indicate that job autonomy overlaps modestly with the satisfaction of the need for autonomy ($r = 0.38$; van den Broeck et al., 2016; Cohen, 1988).

The alluring and motivational potential of basic needs derives from their broadening and essential nature. That is, while basic need satisfaction advances psychological growth and integration, their frustration will foster developmental deficits and fragmentation (Vansteenkiste & Ryan, 2013). In accordance with these principles, numerous studies revealed that organizations can foster employees' motivation by designing a work environment that nurtures the basic needs for autonomy, relatedness, and competence (van den Broeck et al., 2016). However, the proposition by SDT that individuals may proactively seek or create situations to satisfy their basic needs themselves received relatively little attention (Deci & Ryan, 1980; Deci & Vansteenkiste, 2004).

### 1.2. Playful work design

To foster research on how employees satisfy their needs, Bakker and van Woerkom (2017) called for research on 'self-determination strategies'. Self-determination strategies concern proactive behaviors that satisfy basic needs and facilitate optimal experiences during work. Playful work design (PWD) represents a self-determination strategy that refers to the use of play during work (Bakker, Scharp, et al., 2020; Scharp et al., 2019). PWD is defined as the proactive cognitive-behavioral orientation to work activities that employees utilize to (1) design fun and (2) design competition (Scharp et al., 2019). PWD builds on the notion that "play" is not an activity, but rather an approach to performing an activity (Mainemelis & Ronson, 2006). Thus, PWD represents an individual work design strategy – a self-initiated strategy to organize one's work tasks and activities (Parker et al., 2017). That is, when individuals design their work to be playful, they cognitively and behaviorally reorganize their activities through play. For instance, approaching and performing work activities with a playful narrative or as exciting competitions may provide employees with meaning, fun, and challenge by creating surprises and complexities (e.g., what will I discover?; will I beat my record?) and resolving them (e.g., I found an amusing explanatory narrative; I beat my record).

PWD differs from other bottom-up work design strategies such as job crafting because of its focus on changing the experience of work by approaching and performing activities in a playful fashion rather than altering one's occupational role through expansion and contraction (Lazazzara et al., 2020). That is, job crafting can be conceptualized as self-initiated expansion (promotion/approach-oriented) and contraction (prevention/avoidance-oriented) of the scope of the job (Laurence, 2010; Wrzesniewski & Dutton, 2001; Zhang & Parker, 2019). Building on this framework, Bindl et al. (2019) discuss task, relational, skill, and cognitive crafting. To illustrate, a criminal defense attorney may try to get to know certain colleagues in the firm while avoiding others (relational crafting), participate in courses to advance or maintain expertise (skill crafting), take on additional tasks or hire an assistant to work on certain tasks (task crafting), and reflect on how their work maintains justice or avoid thinking about clients that were guilty (cognitive crafting). In contrast with these examples, PWD does not change the scope of one's job but instead focuses on changing the experience of work activities by approaching and performing them in a playful fashion. For instance, the lawyer may aim to make meetings with their colleague regarding a case more fun by integrating humor (designing fun) or more challenging by trying to predict their opinion (designing competition). In support of the distinction between PWD and job crafting, a recent daily diary study revealed that PWD

incrementally predicts other-rated job performance beyond job crafting (Bakker, Hetland, et al., 2020).

Designing fun encompasses ludic play strategies such as the use of humor and fantasy that focus on light-hearted pleasure (i.e., amusement, fun). Designing competition comprises agonistic play strategies such as the use of goals and rules that focus on the pleasure derived from stretching one's skill (i.e., diligence, challenge). The dimensions of PWD reflect the duality described in the play literature that characterizes play in terms such as unstructured or structured, imaginary or real, playful or serious, arbitrary or rule-bound, and irrational or rational (Kolb & Kolb, 2005). When individuals design work to be more playful, they tend to report more optimal experiences such as work engagement – an affective-motivational work-related state of well-being characterized by vigor, dedication, and absorption (Scharp et al., 2019; Scharp, Bakker, et al., 2021; Schaufeli et al., 2002). While these studies indicate that PWD relates to work engagement, the mechanism that explains this association remains elusive. Building on SDT, we argue that the self-determined satisfaction of the need for autonomy, relatedness, and competence may explain the association between PWD and employee engagement.

### 1.3. Playful work design and the need for autonomy

The need for autonomy describes the need for experiences of volition, self-direction, and choice (DeCharms, 1968; Deci & Ryan, 2000). Such agency experiences emerge when behavior is self-endorsed and an expression of the self. Proactive behaviors like PWD nurture autonomy experiences due to their self-starting nature (Strauss & Parker, 2014). That is, individuals *choose* to engage in proactive behaviors, which fosters a sense of autonomy. Moreover, quasi-experimental and observational research suggests that the use of humor and fantasy — core components of designing fun — may promote autonomy experiences by enabling employees to take control of their situation and internal state (Crawford & Caltabiano, 2011; Honeycutt et al., 1989). To illustrate, on days when cashiers exchange jokes with customers or imagine funny narratives, they may actively direct the situation and their emotions; creating a sense of control where others may experience heteronomy (i.e., sense of being controlled). Similarly, when employees design competition during work, they create personal goals; taking control of direction and focus. For instance, on days when retail sales workers create personal challenges such as folding items within a time limit or closing more sales than yesterday, they take control of how they perform their work. Research suggests that such personally formulated goals promote a sense of self-direction and volition (Patall et al., 2008). Taken together, we propose:

**Hypothesis 1**. On days when employees (a) design fun and (b) design competition, they feel more engaged with work because they satisfy their need for autonomy.

### 1.4. Designing fun and the need for relatedness

The need for relatedness refers to experiences of interpersonal affiliation, belongingness, and unity (Baumeister & Leary, 1995). Situations that cause employees to perceive themselves as part of a group, care for others, or develop affiliative relationships with colleagues, satisfy the need for relatedness (Deci & Ryan, 2000). Employees may stimulate experiences of relatedness through designing fun because this behavior implies fostering lighthearted interactions with others and making activities fun for all parties involved such as colleagues or clients (Scharp et al., 2019). For instance, theoretical and empirical literature suggests that the use of humor creates social closeness and intimacy in relationships by fostering harmony, collegiality, and trust (Mesmer-Magnus et al., 2012). Similarly, the use of imagination to produce entertaining and interpersonal scenarios relates to feelings of connectedness and belongingness (Honeycutt & Keaton, 2012; Poerio et al., 2016). Finally, in a recent diary study, Scharp, Breevaart, et al. (2021) showed that on days when employees faced work conditions that thwarted relatedness experiences (e.g., isolation and conflict), they could sustain their work engagement by designing fun during their workday. The authors argued that designing fun may have buffered the negative consequences of such conditions by directly promoting interpersonal affiliation, belongingness, and unity. The present study tests these assertions and therefore develops new insights regarding the processes that may explain these findings. Hence, we expect:

**Hypothesis 2**. On days when employees design fun, they feel more engaged with work because they satisfy their need for relatedness.

### 1.5. Designing competition and the need for competence

The need for competence describes the need to develop, feel effective in producing results, and feel proficient in terms of skills (Deci & Ryan, 2000; White, 1959). Competence builds on positive feedback, developing capacities, and conquering challenges. On days when employees design competition, they may proactively create such conditions. Namely, when employees design their work tasks to be more competitive, they strive to make their work more challenging through play. These strategies may include reframing work activities as puzzles, monitoring performance, creating additional action opportunities through segmentation (e.g., “levels”), and setting personal goals during tasks (Scharp et al., 2019). While research on designing competition is scarce, goal-setting research suggests that setting specific and difficult goals during tasks promotes motivation and engagement, because goal-setting creates a sense of achievement and competence (Locke & Latham, 2019). In line with this reasoning, a recent diary study showed that on days when employees designed competition, they maintained their work engagement despite hindrance job demands such as simplicity and underload, which undermine the sense of competence (Scharp, Breevaart, et al., 2021). The authors explained this finding by arguing that on days when employees design competition, they proactively create opportunities to feel competent. By testing these assumptions, we advance new knowledge regarding why designing competition especially benefits certain job conditions. Therefore, we

propose:

**Hypothesis 3**. On days when employees design competition they feel more engaged with work because they satisfy their need for competence.

Day-to-day dynamics of playful work design

Time shapes most phenomena, tightening or diminishing their associations (Kozlowski & Klein, 2000). Indeed, the proposed processes are "interrelated in a dynamic manner and do not occur in a temporal vacuum" (Chan, 1998, p. 242). However, we are unaware of any quantitative research on the day-to-day dynamics of play during work (Celestine & Yeo, 2021; Petelczyc et al., 2018). Theoretically, Huizinga (1949) argued that play takes place "within certain limits of space and time" (p. 9). The boundaries in space and time separate play from "normal" life and describe how individuals *temporally* suspend reality and superimpose the experiential qualities of play on an activity (Csikszentmihalyi, 1975; Mainemelis & Ronson, 2006; Scharp et al., 2019). To illustrate, imagine a security officer in a retail store who monitors customers. When the security officer predicts where certain customers will walk to next, positive feedback may generate a *momentary* sense of competence and work engagement that dissipates over time. In other words, such behaviors are unlikely to stimulate a sense of efficacy on the subsequent day incrementally to the PWD behaviors of that next day. Moreover, other factors in-between measurement points may represent more important determinants of need satisfaction and work engagement such as daily job conditions (Wang et al., 2020), detachment from work during the evening (Sonnentag & Kühnel, 2016), as well as morning home demands (Dettmers et al., 2020). Thus, the findings may position personal psychological resources and work engagement as short-term as opposed to delayed consequences of PWD. Taken together, we expect that:

**Hypothesis 4**. The proposed associations of PWD with satisfaction, and work engagement are stronger during the same time interval than with next-day need satisfaction and work engagement.

### *1.6. Equivalence of path coefficients across levels*

Brown and Ryan (2007) stress the importance of investigating intra- and interindividual variability of the proposed motivational processes. Namely, the theoretical interpretation of phenomena may differ across levels of analysis (Ohly et al., 2010). While the equivalence of associations across levels of analysis adds to the parsimony of theories, discrepancies signal the need to refine theories (Chen et al., 2005). Typically, researchers employ a single-level design to indirectly examine how associations generalize to other levels of analysis instead of explicitly testing the invariance of associations in a single model with the same participants. Therefore, Gabriel et al. (2019) argue researchers should simultaneously examine relations by aggregating within-person measures to a higher level. While PWD does have a momentary focus (level-1), employees may design work to be more playful over an extensive time period (level-2). The question remains whether daily PWD and general PWD have equivalent meaning and consequences in terms of need satisfaction and work engagement, which limits our understanding of when PWD is beneficial. For instance, while aiming to outperform oneself might be exciting, doing this every day might become mundane. Thus far, previous research seems to indicate that PWD manifests itself equivalently across levels (Scharp et al., 2019). In other words, the meaning of PWD seems to be equivalent across within and between levels of analysis. This suggests that the function of PWD – fostering engagement with work through stimulating personal psychological resources – may operate in a similar fashion. Based on these preliminary findings, we predict that the hypothesized processes operate similarly at the daily and general levels of analysis in terms of configural (i.e., have similar patterns of significance across levels of analysis) and metric invariance (i.e., have an equivalent magnitude of coefficients across levels of analysis; Chen et al., 2005; Muthén & Muthén, 1998–2017).

**Hypothesis 5**. The associations in the process model show (a) configural and (b) metric invariance.

## 2. Method

### *2.1. Procedure and participants*

Participants were recruited in The Netherlands by psychology students via network sampling as part of their thesis requirements. Students utilized their social network to contact companies and professionals, and made use of snowball sampling (i.e., existing participants recruit other respondents from their personal circle). This sampling strategy may enhance the external validity of the findings by increasing the heterogeneity of the sample (Demerouti & Rispens, 2014). The participants did not receive any compensation for their participation. Prior to data collection, we informed respondents about the general purpose of the study, research design, voluntary participation, and confidentiality of their responses. Individuals who consented to participate first filled out a general survey (i.e., demographics). In the subsequent week, participants received an email at the end of each workday at 4 PM with a link to the daily questionnaire. To reduce recall bias, participants were only able to fill-out surveys until midnight. Following Nezlek's (2011) recommendations, we only analyzed the data of participants from the original sample ($N = 234$) who filled out at least two daily diary surveys ($N = 162$; response rate = 69.23%). The mean of returned daily surveys per respondent was 3.72 ($n = 162$ persons $\times$ 3.72 = 603 observations). The sample comprised 84 women (51.9%) and 78 men (48.1%). On average, individuals were 39.60 years of age ($SD = 13.63$), had 17.61 years of work experience ($SD = 13.54$), and 8.75 years of organizational tenure ($SD = 9.61$). Most participants were permanently employed (69.1%), either cohabiting or married (65.4%), and lived without children at home (56.1%). The sample consisted of respondents who received a degree from a university of applied sciences (39.5%), an academic university (24.1%), or a vocational school (17.3%). Participants worked in a variety of occupational sectors such as government (19.1%), health

(17.3%), business and finance (11.1%), industry (9.3%), education (5.6%), or trade (5.8%).

### 2.2. Measures

Using multilevel confirmatory factor analyses, we computed within- and between-person reliabilities (Geldhof et al., 2014). All scales were sufficiently reliable (see Table 1) and rated on the same 7-point scale (1 = *not true at all* to 7 = *totally true*). Reliabilities equal to or greater than 0.70 are considered to be acceptable, whereas values that exceed 0.80 are indicative of good reliability (Cortina, 1993; Taber, 2018).

#### 2.2.1. Playful work design

We measured PWD with the daily version of the two-dimensional PWD instrument (Scharp et al., 2019; Scharp, Bakker, et al., 2021). The instrument measures designing fun and designing competition with six items each. The daily designing fun subscale includes the items: "Today, I looked for ways to make tasks more fun for everyone involved", "Today, I used humor to make my work more fun", and "Today, I used my imagination to make my job more interesting". Example statements of the daily designing competition subscale are: "Today, I competed with myself at work – not because I had to, but because I enjoyed it", "Today, I approached my job as a series of exciting challenges", and "Today, I tried to set time records in my work tasks".

#### 2.2.2. Basic need satisfaction

We assessed the satisfaction of basic needs with the daily version (van Hooff & Geurts, 2015) of the work-related need satisfaction scale (Van den Broeck et al., 2010). The scale measures the satisfaction of the need for autonomy (3 items), relatedness (3 items), and competence (4 items). Example items are: "Today, I felt free to do my job the way I think it could best be done" (autonomy), "Today, I felt part of a group" (relatedness), and "Today, I felt competent at my job" (competence).

#### 2.2.3. Work engagement

We measured work engagement with the daily version (Breevaart et al., 2012) of the 9-item Utrecht Work Engagement Scale (Schaufeli et al., 2002). The scale measures the three dimensions of work engagement with three items each. Sample items are: "Today, I felt bursting with energy" (i.e., vigor), "Today, I was inspired by my job" (i.e., dedication), and "Today, I was immersed in my work" (i.e., absorption).

### 2.3. Analytical procedure

The diary data has a two-level structure where daily observations ($n$ = 603) are nested in individuals ($N$ = 162). Indeed, the intraclass coefficients (ICC) justify multilevel modeling since within-person differences explain 30.8% to 61.8% of the variance and differences between individuals 38.2% to 69.2% of the variance (see Table 1). Accordingly, multilevel analyses were conducted using Mplus 8.5 (Muthén & Muthén, 1998–2017). First, we conducted a multilevel confirmatory factor analysis to assess the equivalence of the constructs across the levels of analysis. For model convergence, we computed parcels for constructs with more than five indicators according to the balanced item-to-construct approach (Little et al., 2002). Model fit was assessed by computing the root mean square error of approximation (RMSEA), comparative fit index (CFI), and the standardized root mean square residual (SRMR) using the robust maximum likelihood (MLR) estimator. Acceptable fit values range up to 0.08 for the RMSEA, above 0.90 for the CFI, and below 0.10 for the SRMR (Schweizer, 2010). To assess the mediation hypotheses, we conducted multilevel analyses to estimate the path coefficients on both levels of analysis simultaneously. Level-1 variables consisted of daily observations (person-mean centered), whereas level-2 variables were computed by averaging the level-1 observations (grand-mean centered). We included lagged variables to test the links between PWD and next-day need satisfaction and next-day work engagement. Additionally, we included the cross-lagged and autoregressive effects of the focal variables. Hence, the coefficients represent unique "changes' in daily observations of PWD, need satisfaction, and work engagement. Moreover, this procedure yields more accurate parameter estimates (Wilkins, 2018). Finally, we assessed the equivalence of the associations in terms of configural similarity (i.e., a similar pattern of significance across levels of

**Table 1**
Means, standard deviations, intercorrelations, intraclass coefficients, and reliabilities of the study variables.*

| | *M* | *SD* | *ICC* | 1. | 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|---|---|---|---|---|
| 1. Designing fun | 4.09 | 1.23 | 62.9% | 0.97(0.79) | 0.71** | 0.37** | 0.44** | 0.37** | 0.56** |
| 2. Designing competition | 3.88 | 1.99 | 69.2% | 0.68** | 0.91(0.70) | 0.29** | 0.35** | 0.41** | 0.56** |
| 3. Satisfaction of the need for autonomy | 5.48 | 1.04 | 41.3% | 0.36** | 0.28** | 0.90(0.73) | 0.50** | 0.75** | 0.72** |
| 4. Satisfaction of the need for relatedness | 4.76 | 1.26 | 47.4% | 0.43** | 0.32** | 0.43** | 0.86(0.71) | 0.48** | 0.54** |
| 5. Satisfaction of the need for competence | 5.32 | 0.96 | 38.2% | 0.39** | 0.38** | 0.66** | 0.47** | 0.93(0.82) | 0.72** |
| 6. Work engagement | 4.77 | 1.10 | 46.7% | 0.52** | 0.52** | 0.68** | 0.51** | 0.69** | 0.95(0.92) |

*ICC* = Intraclass coefficient. The coefficients on the diagonal without brackets represent between-person reliabilities, whereas the coefficients between brackets represent within-person reliabilities. Correlations above the diagonal are based on between-person averages ($N$ = 162), whereas correlations below the diagonal are based on daily observations ($n$ = 603).

* $p < .05$.

** $p < .01$.

analysis) and metric similarity by constraining the estimates to be equal (i.e., a similar magnitude of the path coefficients across levels of analysis; Chen et al., 2005; Muthén & Muthén, 1998–2017).

## 3. Results

### 3.1. Descriptive statistics

Table 1 presents the means, standard deviations, ICC's, and correlations of the study variables.

### 3.2. Isomorphism of the study variables

To assess whether the constructs are similar across levels, we conducted a multilevel confirmatory factor analysis. The measurement model included six latent factors at the between- and within-person levels of analysis: designing fun (3 parcels), designing competition (3 parcels), autonomy satisfaction (3 items), relatedness satisfaction (3 items), competence satisfaction (4 items), and work engagement (3 subscales). The model showed an acceptable fit to the data ($\chi^2$ (274) = 505.62, RMSEA = 0.037, CFI = 0.954, and $SRMR_{within}$ = 0.047, $SRMR_{between}$ = 0.098). All standardized factor loadings ranged from 0.52 to 0.99 on the between-person level ($p < .001$) and from 0.62 to 0.89 on the within-person level ($p < .001$). The pattern of significance and number of dimensions was similar across levels of analysis. In addition, constraining the factor loadings to be equal did not change model fit ($\Delta\chi^2$ (13) = 18.66, $p = .134$). In other words, the factor loadings are equivalent across levels of analysis. These findings indicate that the variables are conceptually similar across levels. Hence, we proceed to test our hypotheses.

### 3.3. Mediation hypotheses

We test the hypothesized mediations across the levels of analysis in a single model as opposed to different models for two reasons. First, merely estimating level-1 associations without specifying their level-2 counterparts may bias results and lead to faulty interpretations (Antonakis et al., 2021; King & Roberts, 2015). Second, testing indirect effects in a piecemeal fashion biases results, because this approach does not estimate all parameters of interest simultaneously (Preacher et al., 2007; see Table 2).

Table 3 presents the indirect associations between PWD and work engagement via need satisfaction. We expected that on days

**Table 2**
Standardized estimated effects for the indirect effects model.

| | Designing fun (*X*) | | Designing competition (*X*) | | Autonomy satisfaction (*M*) | | Relatedness satisfaction (*M*) | | Competence satisfaction (*M*) | | Work engagement (*Y*) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *b** | *SE* | *b** | *SE* | *b** | *SE* | *b** | *SE* | *b** | *SE* | *b** | *SE* |
| Level 2 | | | | | | | | | | | | |
| Designing fun ($\gamma_{01}$) | | | | | 0.32** | 0.12 | 0.38** | 0.12 | 0.17 | 0.11 | 0.13 | 0.07 |
| Designing competition ($\gamma_{02}$) | | | | | 0.06 | 0.13 | 0.08 | 0.12 | 0.29** | 0.12 | 0.22** | 0.06 |
| Satisfaction of the need for autonomy ($\gamma_{03}$) | | | | | | | | | | | 0.35** | 0.07 |
| Satisfaction of the need for relatedness ($\gamma_{04}$) | | | | | | | | | | | 0.11* | 0.05 |
| Satisfaction of the need for competence ($\gamma_{05}$) | | | | | | | | | | | 0.27** | 0.07 |
| Between-person variance explained ($R_2^2$) | | | | | 0.14** | 0.05 | 0.19** | 0.06 | 0.18** | 0.06 | 0.69** | 0.05 |
| Level 1 | | | | | | | | | | | | |
| Designing fun ($\gamma_{10}$) | | | | | 0.20** | 0.08 | 0.38** | 0.10 | 0.30** | 0.09 | 0.15 | 0.08 |
| Designing competition ($\gamma_{20}$) | | | | | 0.22** | 0.08 | 0.01 | 0.10 | 0.23** | 0.09 | 0.21** | 0.08 |
| Satisfaction of the need for autonomy ($\gamma_{30}$) | | | | | | | | | | | 0.30** | 0.08 |
| Satisfaction of the need for relatedness ($\gamma_{40}$) | | | | | | | | | | | 0.10 | 0.07 |
| Satisfaction of the need for competence ($\gamma_{50}$) | | | | | | | | | | | 0.29** | 0.07 |
| Lagged designing fun ($\gamma_{60}$) | −0.18* | 0.08 | | | 0.06 | 0.07 | 0.12 | 0.09 | 0.05 | 0.07 | 0.04 | 0.07 |
| Lagged designing competition ($\gamma_{70}$) | | | −0.11 | 0.09 | 0.04 | 0.09 | 0.02 | 0.08 | 0.06 | 0.08 | 0.11 | 0.07 |
| Lagged autonomy satisfaction ($\gamma_{80}$) | −0.10 | 0.09 | −0.13 | 0.07 | −0.32** | 0.06 | | | | | 0.14* | 0.07 |
| Lagged relatedness satisfaction ($\gamma_{90}$) | 0.04 | 0.08 | −0.02 | 0.08 | | | −0.17** | 0.06 | | | 0.06 | 0.05 |
| Lagged competence satisfaction ($\gamma_{100}$) | 0.06 | 0.10 | 0.01 | 0.09 | | | | | −0.30** | 0.06 | −0.01 | 0.08 |
| Lagged work engagement ($\gamma_{110}$) | 0.20 | 0.14 | 0.17 | 0.12 | 0.21** | 0.08 | 0.10 | 0.09 | 0.17 | 0.11 | −0.16* | 0.07 |
| Within-person variance explained ($R_1^2$) | 0.04 | 0.03 | 0.02 | 0.02 | 0.18** | 0.05 | 0.18* | 0.08 | 0.19** | 0.07 | 0.49** | 0.05 |

* $p < .05$.
** $p < .01$.

when employees (H1a) design fun and (H1b) design competition, they feel more engaged because of satisfaction of the need for autonomy. As predicted, daily designing fun ($ab = 0.06$, $SE = 0.02$, $p < .05$) was indirectly related to daily work engagement via daily autonomy satisfaction, whereas the association for daily designing competition was not significant ($ab = 0.08$, $SE = 0.04$, $p = .054$). Hypothesis 2 states that daily designing fun is indirectly associated with daily work engagement through daily relatedness experiences. Unexpectedly, on days when employees designed fun, they did not feel more engaged because they satisfied their need for relatedness ($ab = 0.04$, $SE = 0.03$, $p = .144$). Finally, we hypothesized that daily designing competition would promote daily work engagement through daily competence satisfaction (Hypothesis 3). Indeed, the proposed indirect effect of daily designing competition was significant ($ab = 0.08$, $SE = 0.04$, $p < .05$). In further support of the hypothesized indirect effects, the proposed mediation model showed a more accurate fit to the data than the direct effects model that omits the associations between PWD and need satisfaction ($\Delta\chi^2(12) = 96.01$, $p < .001$). Taken together, the results provide partial support for the proposed intra- and interindividual process model.

### 3.4. Playful work design from day-to-day

To investigate the day-to-day dynamics of PWD, we explored the lagged associations of PWD. We regressed need satisfaction and work engagement on designing fun and designing competition of the previous day. The lagged effects were neither associated with need satisfaction nor work engagement. Specifically, designing fun ($b^* = -0.06$, $SE = 0.07$, $p = .431$) and designing competition ($b^* = 0.04$, SE = 0.09, $p = .695$) were not related to autonomy satisfaction on the next day; designing fun ($b^* = 0.12$, $SE = 0.09$, $p = .183$) and designing competition ($b^* = 0.02$, $SE = 0.08$, $p = .777$) were not associated with next-day relatedness satisfaction; and, designing fun ($b^* = 0.05$, $SE = 0.07$, $p = .486$) and designing competition ($b^* = 0.06$, $SE = 0.08$, $p = .399$) were not associated with competence satisfaction on the next day. Finally, designing fun ($b^* = 0.04$, $SE = 0.07$, $p = .588$) and designing competition ($b^* = 0.11$, $SE = 0.07$, $p = .129$) were also unrelated to next-day work engagement. Thus, in support of Hypothesis 4, the findings suggest that the effects of daily designing fun and daily designing competition only occur during the same time interval.

### 3.5. Path coefficients across levels

Hypothesis 5 proposes that the coefficients of the mediation model show (a) configural and (b) metric similarity. In partial support of Hypothesis 5a, nine out of eleven (81.81%) associations showed the same level of significance across levels (i.e., configural equivalence; see Table 2). Two associations differed in terms of their significance when we compared between- with within-person differences. The association between designing competition and the need for autonomy was significant on the within-person level ($b^* = 0.22$, SE = 0.08, $p < .01$), but was nonsignificant on the between-person level ($b^* = 0.06$, SE = 0.13, $p = .637$). In addition, on days when employees designed fun, they felt more competent ($b^* = 0.38$, SE = 0.10, $p < .01$); however, at the general level, results showed that employees who are generally inclined to design fun during work do not feel more competent in general ($b^* = 0.17$, SE = 0.11, $p = .130$). Next, we examined the metric invariance of the configurally similar coefficients by constraining their magnitudes to be equal across the levels of analysis. In support of metric invariance (H5b), the addition of the constraints did not change model fit ($\Delta\chi^2(9) = 3.97$, $p = .913$). In other words, these between-person coefficients are equivalent to their within-person counterparts.

### 3.6. Additional analyses

Since designing fun and designing competition represent dimensions of a latent construct (i.e., playful work design), the interrelation may influence results. Hence, to examine the effect of the interdependence between designing fun and designing competition, we included their interaction on the between- and within-person level of analysis (Table 4). While none of the interaction effects reached significance on the within-person level, the between-person interactions between designing fun and designing competition related positively to overall autonomy ($b^* = 0.24$, $SE = 0.06$, $p < .001$) and competence satisfaction ($b^* = 0.18$, $SE = 0.06$, $p < .01$), and work engagement ($b^* = 0.11$, $SE = 0.04$, $p < .01$) but not to the satisfaction of the need for relatedness ($b^* = 0.04$, $SE = 0.09$, $p = .509$). To probe the conditional effects, we calculated the slopes of designing fun at lower (–1SD from the mean) and higher (+SD from the mean) values of designing competition. The pattern of the slopes of all three significant interactions reveals that the combined overall

**Table 3**
Unstandardized estimated indirect effects of designing fun and designing competition on work engagement through need satisfaction.

| Predictor | Mediator | Indirect effect | | | | | |
|---|---|---|---|---|---|---|---|
| | | General work engagement | | | Daily work engagement | | |
| | | *ab* | *SE* | *95% CI* | *ab* | *SE* | *95% CI* |
| Designing fun | Autonomy | 0.10* | 0.04 | 0.01, 0.18 | 0.06** | 0.03 | 0.01, 0.11 |
| | Relatedness | 0.04 | 0.02 | −0.01, 0.08 | 0.04 | 0.03 | −0.01, 0.09 |
| | Competence | 0.04 | 0.03 | −0.02, 0.09 | 0.09** | 0.03 | 0.02, 0.15 |
| Designing competition | Autonomy | 0.02 | 0.04 | −0.06, 0.09 | 0.08 | 0.04 | −0.01, 0.15 |
| | Relatedness | 0.01 | 0.01 | −0.01, 0.03 | 0.01 | 0.01 | −0.02, 0.02 |
| | Competence | 0.06* | 0.03 | 0.01, 0.12 | 0.08* | 0.03 | 0.01, 0.16 |

* $p < .05$.
** $p < .01$.

**Table 4**
Standardized estimated effects for the conditional indirect effects model.

| | Desinging fun (*X*) | | Designing competition (*X*) | | Autonomy satisfaction (*M*) | | Relatedness satisfaction (*M*) | | Competence satisfaction (*M*) | | Work engagement (*Y*) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *b** | *SE* | *b** | *SE* | *b** | *SE* | *b** | *SE* | *b** | *SE* | *b** | *SE* |
| Level 2 | | | | | | | | | | | | |
| Designing fun ($\gamma_{01}$) | | | | | 0.36** | 0.11 | 0.39** | 0.12 | 0.20 | 0.11 | 0.15* | 0.07 |
| Designing competition ($\gamma_{02}$) | | | | | 0.05 | 0.09 | 0.08 | 0.12 | 0.28** | 0.06 | 0.21** | 0.06 |
| Satisfaction of the need for autonomy ($\gamma_{03}$) | | | | | | | | | | | 0.32** | 0.07 |
| Satisfaction of the need for relatedness ($\gamma_{04}$) | | | | | | | | | | | 0.12* | 0.05 |
| Satisfaction of the need for competence ($\gamma_{05}$) | | | | | | | | | | | 0.26** | 0.06 |
| Designing fun × designing competition ($\gamma_{06}$) | | | | | 0.24** | 0.04 | 0.06 | 0.08 | 0.18** | 0.06 | 0.11** | 0.04 |
| Between-person variance explained ($R_2^2$) | | | | | 0.19** | 0.05 | 0.20** | 0.06 | 0.21** | 0.05 | 0.71** | 0.05 |
| Level 1 | | | | | | | | | | | | |
| Designing fun ($\gamma_{10}$) | | | | | 0.20** | 0.08 | 0.38** | 0.10 | 0.28** | 0.09 | 0.17* | 0.08 |
| Designing competition ($\gamma_{20}$) | | | | | 0.22** | 0.09 | 0.02 | 0.10 | 0.24** | 0.09 | 0.19* | 0.08 |
| Satisfaction of the need for autonomy ($\gamma_{30}$) | | | | | | | | | | | 0.29** | 0.08 |
| Satisfaction of the need for relatedness ($\gamma_{40}$) | | | | | | | | | | | 0.10 | 0.07 |
| Satisfaction of the need for competence ($\gamma_{50}$) | | | | | | | | | | | 0.30** | 0.07 |
| Lagged designing fun ($\gamma_{60}$) | −0.18* | 0.08 | | | −0.06 | 0.07 | 0.12 | 0.09 | 0.06 | 0.07 | 0.03 | 0.07 |
| Lagged designing competition ($\gamma_{70}$) | | | −0.11 | 0.09 | 0.04 | 0.09 | 0.02 | 0.08 | 0.06 | 0.08 | 0.11 | 0.07 |
| Lagged autonomy satisfaction ($\gamma_{80}$) | −0.10 | 0.09 | −0.13 | 0.07 | −0.32** | 0.06 | | | | | 0.14* | 0.07 |
| Lagged relatedness satisfaction ($\gamma_{90}$) | 0.04 | 0.08 | −0.02 | 0.08 | | | −0.18** | 0.06 | | | 0.05 | 0.05 |
| Lagged competence satisfaction ($\gamma_{100}$) | 0.06 | 0.10 | 0.01 | 0.09 | | | | | −0.30** | 0.05 | −0.01 | 0.08 |
| Lagged work engagement ($\gamma_{110}$) | 0.20 | 0.14 | 0.17 | 0.12 | 0.21** | 0.08 | 0.10 | 0.09 | 0.16 | 0.11 | −0.15* | 0.07 |
| Designing fun × designing competition ($\gamma_{120}$) | | | | | −0.01 | 0.04 | −0.03 | 0.03 | −0.09 | 0.05 | 0.09 | 0.06 |
| Within-person variance explained ($R_1^2$) | 0.04 | 0.03 | 0.02 | 0.02 | 0.18** | 0.05 | 0.18* | 0.07 | 0.19** | 0.06 | 0.50** | 0.06 |

* $p < .05$.
** $p < .01$.

use of PWD strategies has synergetic effects (Fig. 2). Namely, while the association between designing fun and autonomy satisfaction is amplified when designing competition is higher (+1SD: $b = 0.42$, SE = 0.09, $p < .001$), the relation disappears when designing competition is lower (–1SD: $b = 0.13$, SE = 0.09, $p = .146$). A similar pattern was found for competence satisfaction (+1SD: $b = 0.23$, SE = 0.08, $p < .01$; –1SD: $b = 0.04$, SE = 0.08, $p = .644$) and work engagement (+1SD: $b = 0.20$, SE = 0.07, $p < .01$; –1SD: $b = 0.06$, SE = 0.06, $p = .296$). Finally, conditional indirect effect analyses revealed that the effects of the interaction term on need satisfaction extent to work engagement (see Table 5). The results suggest that while the effects of designing fun and designing competition operate relatively independently across situations (within-person), they amplify each other's effects on the between-person level. Employees who have the tendency to alternate between and/or combine designing fun and designing competition during the week experience higher levels of work engagement than employees who have the tendency to only utilize a single PWD strategy throughout the week.

## 4. Discussion

Using SDT (Deci et al., 2017; Deci & Ryan, 2000), we developed and tested a multilevel process model that sheds light on the underlying mechanisms that explain why PWD and work engagement coincide. We predicted and found that when employees design fun and design competition, they feel energized, dedicated, and absorbed, because they experience agency, belongingness, and competency. As hypothesized, the results revealed that the associations of PWD only occurred during the same time interval, which suggests that the effects of PWD are immediate and momentary as opposed to delayed. Finally, the process was largely equivalent across levels. However, the synergy between the use of designing fun and designing competition was only present when we considered differences between individuals. These findings provide an intricate account of the similarities and discrepancies between daily PWD (within-person differences) and overall PWD (between-person differences).

### 4.1. Theoretical implications

The present research offers four central contributions to the literature on SDT and PWD. First, despite the name of *Self-Determination* Theory (Deci et al., 2017; Deci & Ryan, 2000), research utilizing SDT has predominantly investigated how the *provision* of certain job

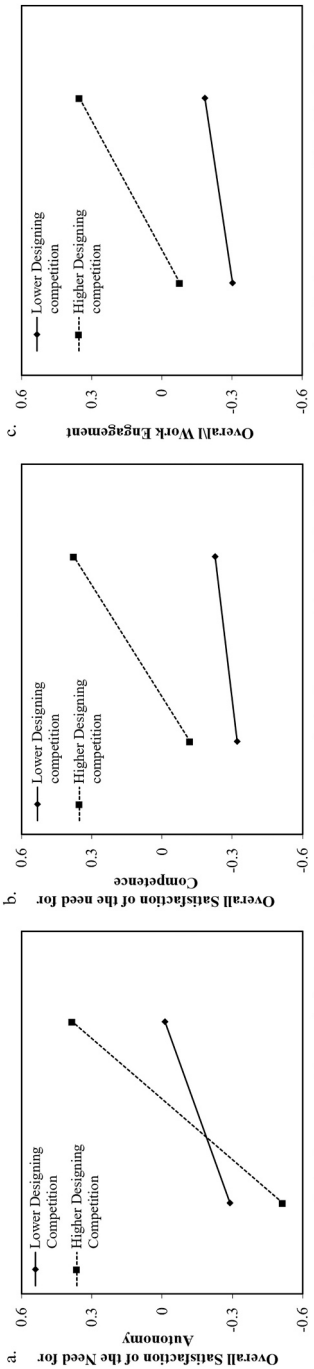


**Fig. 2.** Interactions between general tendency of designing fun, designing competition and the satisfaction of the need for autonomy (a), competence (b), and work engagement (c).

**Table 5**
Unstandardized estimated conditional indirect effects of designing fun and designing competition on work engagement through need satisfaction.*

| Predictor | Designing Competition | Mediator | Conditional Indirect effect | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | General work engagement | | | Daily work engagement | | |
| | | | *ab* | *SE* | *95% CI* | *ab* | *SE* | *95% CI* |
| Designing Fun | −1SD | Autonomy | −0.05 | 0.05 | −0.15, 06 | 0.06 | 0.03 | −0.01, 0.12 |
| | +1SD | | 0.24** | 0.05 | 0.14, 0.35 | 0.06 | 0.03 | −0.01, 0.11 |
| | −1SD | Relatedness | −0.01 | 0.07 | −0.14, 0.13 | 0.05 | 0.03 | −01, 0.11 |
| | +1SD | | 0.08 | 0.07 | −0.05, 0.21 | 0.02 | 0.03 | −0.04,. 08 |
| | −1SD | Competence | −0.05 | 0.04 | −0.14, 0.03 | 0.13** | 0.03 | 0.07, 0.19 |
| | +1SD | | 0.14** | 0.04 | 0.07, 0.21 | 0.03 | 0.05 | −0.07, 0.13 |

* $p < .05$.
** $p < .01$.

conditions satisfies employees' basic needs (Van den Broeck et al., 2016). These studies inform us that when organizations provide employees with, for instance, opportunities to make decisions, access to social support, and feedback, employees feel more motivated because these conditions satisfy their basic needs. However, they do not reveal how employees *self-determine* the satisfaction of the needs for autonomy, relatedness, and competence (Bakker & van Woerkom, 2017). By stressing the role of the employee, our study crucially complements existing research that has mainly examined how a supportive environment promotes basic need satisfaction. The present study reveals that employees may proactively satisfy their needs by using PWD. Thus, to self-determine the experience of agency, belongingness, and competence, employees may design fun and design competition during work activities.

Second, our findings advance our understanding of how and why PWD relates to work engagement. While previous research revealed that more frequent use of PWD tends to correspond to higher work engagement, the possible underlying mechanisms were unclear. The present study is the first to explore *why* work engagement accompanies PWD (see Bakker, Hetland, et al., 2020; Bakker, Scharp, et al., 2020; Bakker & Van Wingerden, 2021; Scharp et al., 2019; Scharp, Bakker, et al., 2021). Employees felt more autonomous, connected, and competent when they integrated humor and fantasy (designing fun), and goals and rules (designing competition) with their activities, which partially translated into higher work engagement. Moreover, the present study predicted and found differences in how designing fun and designing competition relate to work engagement through satisfying needs (see Tables 2 and 3). These results are important because they help explain previous findings and may guide future research with theorizing about PWD. For instance, in a daily diary study, findings revealed that on days when employees designed fun and designed competition, they limited the negative consequences of hindrances that limit opportunities to feel connected and competent, respectively (Scharp, Breevaart, et al., 2021). The present findings suggest designing fun and designing competition limited the associated consequences of these hindrances by fostering relatedness and competence experiences.

Third, the present study contributes to play theory by investigating the day-to-day dynamics of play. While various scholars proposed that play represents a phenomenon that is short-term and transient in nature, studies that investigated the temporal nature of play empirically are scarce. Indeed, after an integrative review, Petelczyc et al. (2018) concluded that "little is known about the influence of time in determining the consequences of play" (p. 180). The present findings converge with the theoretical propositions of play scholars that argued that play is enacted and "played out" within certain limits in time and space (Huizinga, 1949; Mainemelis & Ronson, 2006). We found that the associations of PWD with basic need satisfaction and work engagement only occurred during the same time interval but did not predict these experiences on the next day. In other words, daily PWD appears to foster short-term changes in employees' well-being and motivation, which dissipate over time. Since the findings suggest PWD predominantly fosters changes in well-being *while* PWD is enacted, PWD may particularly serve as a strategy to raise momentary motivation and deal with immediate need thwarting. Nonetheless, the present findings do not rule out the possibility of delayed long-term effects on other variables such as task knowledge. Future research may examine such patterns over time by employing richer datasets in terms of average cluster size (i.e. average observations per individual), and conducting growth curve modeling.

Fourth, our study answers calls for multilevel research on play (Petelczyc et al., 2018), basic need satisfaction (Brown & Ryan, 2007), and work engagement (Xanthopoulou & Bakker, 2021). Most research implicitly assumes that constructs and their consequences are isomorphic (i.e., have equivalent meaning across levels; Chen et al., 2005). However, daily (within-person) constructs may differ substantially from their general (between-person) counterparts in meaning and nomological net (Ohly et al., 2010). The present study revealed that the proposed mechanism (i.e., basic need satisfaction) between PWD and work engagement accounted for intra- and interindividual variability in a largely equivalent fashion across levels of analysis. The findings add to the parsimony of theory regarding the direct effects that constitute the processes across the levels of analysis, whereas they highlight an important difference between the two levels of analysis regarding the multiplicative effects of the two dimensions. This synergy only manifested at the between-person level. Thus, on days when individuals design fun and/or design competition, individuals feel more engaged than on days they show relatively less designing fun and designing competition behaviors; the effects are additive and relatively independent. However, individuals who oscillate between, or combine, designing fun and designing competition throughout the week feel more autonomous, competent, and engaged than individuals who rely on either designing fun or designing competition. These differences might be considered in light of the example described in the introduction: "For instance, while aiming to outperform yourself might spark excitement, doing this every day might become mundane".

The multilevel model advances our knowledge on PWD by revealing a few discrepancies between situations (days) and individuals

(general). The associations between (1) designing fun and competence experiences, (2) designing competition and autonomy experiences, and (3) relatedness experiences and work engagement, were not isomorphic. First, when we compared differences between situations, designing fun related positively to competence experiences (within-person). Contrastingly, when we compared differences between individuals, designing fun was not related to feeling competent (between-person level). Possibly, using humor and fantasy generated positive feedback, which stimulated competence experiences (Mesmer-Magnus et al., 2012); however, individuals may only feel more competent compared to others when they actually develop skills and conquer challenges. Second, while daily designing competition was positively associated with daily volition experiences, general designing competition did not relate to autonomy experiences in general. It is possible that designing competition is enacted for different reasons across levels. SDT suggests general designing competition may represent a form of extrinsically motivated behavior that is internalized, because employees deem the behavior important for self-worth (Deci & Ryan, 2000). Consistently designing competition may reflect a strategy to cope with chronic, high levels of job demands. In this respect, designing competition is done for instrumental reasons and becomes a necessity to maintain performance as opposed to behavior done for the sake of challenge, which would undermine the experience of volition. Indeed, the overall use of designing competition was related to the satisfaction of autonomy when it was used in combination with designing fun, which may reflect a more lighthearted attitude to the self-imposed challenges. Finally, designing fun was not indirectly related to work engagement through relatedness on the between- and within-person level of analysis. This converges with previous propositions that the sense of belongingness plays a relatively distal role in fostering intrinsic motivation compared to volition and competence experiences (Deci & Ryan, 2000). The findings underscore the value of utilizing a multilevel approach when investigating PWD, need satisfaction, and work engagement.

### 4.2. *Strengths, limitations, and avenues for future research*

While the multilevel process model offers an intricate account of the association between PWD and work engagement, several limitations should be acknowledged. First, we measured our focal variables at the same time using self-reports with the same scale anchors, which may raise concerns in terms of common method bias and limits inferences regarding causality (Podsakoff, 2003). However, since the variables of our study mainly concern private experiences, self-report measures are more appropriate than other types of measures such as ratings by others (Conway & Lance, 2010). Namely, a third party may have a hard time rating how autonomous or connected an individual feels during a certain workday. Moreover, Beal (2015) argued that alternating scale anchors between measures in daily diary surveys may increase participant burden. We did try to limit method effects in several ways. Namely, we used validated measures and provided evidence for the construct validity of the variables in terms of high reliability coefficients and appropriate factor structures (Conway & Lance, 2010). Additionally, by person-mean centering the within-person variables, we partially corrected for common sources of method bias such as consistency motives, leniency bias, and acquiescence bias (Beal, 2015; Podsakoff, 2003). Finally, we included the lagged associations between variables, which removes the possibility that transient states biased the within-person relationships (Gabriel et al., 2019). Future research may further alleviate common method bias by temporally separating measures and collecting other-source data (Beal, 2015). For instance, future research may investigate to what extend PWD manifests in observable (other-rated) work engagement.

Second, while we predicted and found that PWD fluctuates in harmony with need satisfaction and work engagement across days, the present study was unable to demonstrate causal relations. To help disentangle the causal relations between the focal variables, future research may utilize an experimental design and assign participants to three conditions, providing them with training in the use of (1) designing fun, (2) designing competition, or (3) an unassociated strategy. Subsequently, all three groups should perform a set of tasks that vary in terms of their latitude, interpersonal characteristics, and contextual features. This set-up may reveal how designing fun and designing competition strategies cause experiences of autonomy, relatedness, and competence independent of work characteristics. In a similar vein, micro interventions with repeated, daily measurements might be a promising avenue for future research. For instance, research may strengthen causal inferences regarding the associations between PWD, need satisfaction, and work engagement by comparing a group that receives daily reminders or "nudges" to playfully design work activities with a control group that receives no nudges (Weintraub et al., 2021). Moreover, such research designs also partially alleviate concerns regarding common method bias.

Although basic need satisfaction fully explained the association between designing fun and work engagement, designing competition was also *directly* related to work engagement — equivalently across levels. These associations suggest the presence of another mechanism. Designing competition refers to the process of cognitively and behaviorally restructuring activities using agonistic play elements such as goals and rules (Scharp et al., 2019). Through restructuring an activity, employees may reduce the informational quantity and complexity of the activity and thereby promote effort and immersion (Locke & Latham, 2019; Rheinberg & Engeser, 2018). For instance, striving to beat the clock during an activity or segmenting an activity into several "levels", provides a form of structure that enables employees to allocate their cognitive resources to the task at hand — enabling employees to channel their energies and attention. Preliminary support for this proposition comes from daily diary research that shows when activities lack structure or goals such as when there is little work to do, employees may still create engagement and promote performance by designing competition (Bakker, Hetland, et al., 2020; Scharp, Breevaart, et al., 2021). This proposition warrants further scrutiny.

In a daily diary study, Scharp, Breevaart, et al. (2021) showed on days when employees designed fun and designed competition, they limited the negative consequences of conditions that impede the satisfaction of the needs for relatedness and competence, respectively. The present findings explain these results by revealing that designing fun and designing competition promote relatedness and competence experiences. Taken together, our research suggests employees may also initiate PWD to deal with conditions that increase feelings of heteronomy (i.e., sense of being controlled). In other words, on days when work impedes the satisfaction of the need for autonomy, employees may protect their sense of volition by designing fun and designing competition. However, the present

findings suggest that when we compare individuals (between-person level), designing fun may represent a more effective strategy to protect the experience of volition and self-direction than designing competition. Therefore, future research may investigate how PWD interacts with conditions that increase a sense of heteronomy.

Finally, the present study investigated PWD, i.e., a bottom-up approach to use play to redesign work activities. Future research may investigate how PWD is influenced by top-down play initiatives (e.g., gamification, playful leadership) that aim to integrate play with work. Top-down initiatives that aim to harness the power of play such as gamification (i.e., integrating game elements with non-game contexts; Deterding et al., 2011) differ from PWD in terms of the agent of change and how they achieve change. PWD is self-initiated and describes employees promoting change by approaching and performing their work in a playful fashion, whereas top-down play initiatives are introduced by others and generally promote change by modifying the work environment. For instance, organizations may gamify human resource systems (Silic et al., 2020) or introduce playful cues during meetings (West et al., 2016). Since intrinsic motivation is a core component of play, we predict that the perceived authenticity of these initiatives determines to what extent they will amplify or undermine the motivational potential of PWD. Specifically, top-down play initiatives may especially be effective when they are considered genuine and involve voluntary participation, whereas initiatives that are considered to be unauthentic and exploitive may undermine PWD and instead foster cynicism (Fleming, 2005).

### 4.3. Practical implications

The present findings suggest employees may proactively satisfy their basic needs and cultivate work engagement by playfully designing work activities. Although organizations may facilitate this process by implementing interventions that teach employees to identify and act on play opportunities during work, it is important to note that PWD is a complementary technique to enhance well-being. Therefore, top-down job design initiatives remain an essential approach to fostering need satisfaction and work engagement. Moreover, when organizations sanction play, they may undermine the potential benefits of PWD (Fleming, 2005). Indeed, play theory suggests that intrinsic motivation represents a fundamental component of play (Huizinga, 1949; Mainemelis & Ronson, 2006). Hence, organizations should foster PWD complementary to top-down initiatives to optimize job conditions and participation in PWD courses or workshops should be voluntary.

Interventions that aim to facilitate the use of PWD may focus on creating knowledge and awareness of PWD to develop their "skill" in playfully designing work in several ways. First, interventions may include lectures or reading material about PWD. Exposure to such lectures and material may help participants recognize and act on potential play opportunities during work. Second, participants should have the opportunity to exchange past PWD experiences. By exchanging past experiences, participants reflect on their own experiences and learn from others' examples. Third, to consolidate the newly learned knowledge, interventions should provide PWD exercises such as identifying and mapping work activities that thwart or nurture basic needs and developing PWD strategies accordingly. For instance, research suggests that employees may especially benefit from specific forms of PWD during certain circumstances (Scharp, Breevaart, et al., 2021). Finally, participants may formulate specific goals regarding when, where, and how to implement PWD. Formulating such plans may increase the probability of moving from theory to practice.

### 4.4. Conclusion

The present study provides an analysis of how playful work design promotes work engagement and underscores the multilevel nature of this process. We expanded SDT by arguing and finding that designing fun and designing competition relate to work engagement through satisfying the need for autonomy, relatedness, and competence. In addition, we revealed how this mechanism differs for designing fun and designing competition, and between individuals and across days. These findings suggest that employees may proactively satisfy their needs and foster work engagement through playful work design. In other words, when employees play during work, they may "self-determine" their functioning and well-being.

## CRediT authorship contribution statement

**Yuri S. Scharp**: Conceptualization, Writing, Methodology, Investigation, Formal analysis.
**Arnold B. Bakker**: Conceptualization, Writing, Methodology.
**Kimberley Breevaart**: Conceptualization, Writing, Methodology.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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