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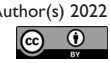

DOI: 10.1177/00187267211070996
journals.sagepub.com/home/hum
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Playful work design: Conceptualization, measurement, and validity

Yuri S Scharp
Erasmus Universiteit Rotterdam, Netherlands

Arnold B Bakker
Erasmus Universiteit Rotterdam, Netherlands
University of Johannesburg, South Africa

Kimberley Breevaart
Erasmus Universiteit Rotterdam, Netherlands

Kaspar Kruup
University of Tartu, Estonia

Andero Uusberg
University of Tartu, Estonia

Abstract

In three different studies, we challenge the traditional view that work and play are mutually exclusive phenomena. We introduce the concept of playful work design – the proactive cognitive-behavioral orientation that employees engage in to incorporate play into their work activities to promote fun and challenge. In Study 1, we utilized expert-ratings and iterative exploratory factor analyses to develop an instrument that measures (1) designing fun and (2) designing competition. Additionally, Study 1 evidences the divergent and convergent validity of the subscales as well as their distinctiveness.

Corresponding author:
Yuri S Scharp, Center of Excellence for Positive Organizational Psychology, Erasmus University Rotterdam, Burgemeester Oudlaan 50, T16-19, PO Box 1738, Rotterdam, 3000 DR, the Netherlands.
Email: scharp@essb.eur.nl

Specifically, playful work design was indicative of proactivity as well as play, and designing fun especially correlated with ludic traits (i.e. traits focused on deriving fun; e.g. humor), whereas designing competition particularly correlated with agonistic traits (i.e. traits focused on deriving challenge; e.g. competitiveness). Study 2 cross-validated the two-factor structure, further investigated the nomological net of playful work design, and revealed that playful work design is distinct from job crafting. Finally, Study 3 examined the predictive and incremental validity of the playful work design instrument with self- and colleague-ratings two weeks apart. Taken together, the results suggest that the instrument may advance our understanding of play initiated by employees during work.

Keywords
competitiveness, job and work design, play at work, playfulness, playful work design, proactive work behavior, scale development, work engagement

> Any action can be practiced as an art, as a craft.
>
> —Stephen Nachmanovitch, *Free Play: Improvisation in Life and Art*, 1990:10

Play represents a universally enjoyable phenomenon, which is why virtually everyone engages in some form of play from time to time (Huizinga, 1949; Sutton-Smith, 2009). Hence, Huizinga contended that humans are not best described as *Homo Sapiens*, mankind who knows; but rather as *Homo Ludens*, mankind who plays. Indeed, play permeates our lives in myriad forms; playfully teasing a friend, joking around, a game of chess, or a soccer match. Individuals pursue play for the sake of fun and challenge. For the same purpose, individuals may want to integrate play with work. Contemporary research has diverged from the traditional paradigm that considered work and play as mutually exclusive phenomena (Butler et al., 2011; Dandridge, 1986; Glynn and Webster, 1992; Kavanagh, 2011). Instead, research has started to focus on their integration (e.g. Celestine and Yeo, 2021; Mainemelis and Ronson, 2006; Petelczyc et al., 2018). Research on play initiatives by organizations and other parties is flourishing. Findings thus far suggest that organizational initiatives such as fun activities, productivity competitions (Tews et al., 2014; Tsaur et al., 2019), providing playful cues during meetings (West et al., 2016), and gamifying work by adding points, badges, and leaderboards (Deterding et al., 2011; Gerdenitsch et al., 2020) cultivate employees' motivation and performance. In the current research, we expand the existing literature on play at work by positioning the employee at the core of the process of integrating play with work.

Although play concerns a widespread phenomenon – with a surging interest from the occupational domain – scant research studied self-initiated play during work (Celestine and Yeo, 2021; Petelczyc et al., 2018; compare to Bakker et al., 2020a, 2020b; Scharp et al., 2019). In this article, we develop new insights about self-initiated play at work by synthesizing the literatures on play and work design. We build on recurrent, and often convergent themes in the literatures on play and self-initiated work design strategies (e.g. personality traits as antecedents; promotion-focus; energy management; performance behaviors). We complement research on play at work that builds on a top–down and activity-based perspective by advancing a bottom–up and approach-based perspective. The core premise of this article is that *employees* may themselves initiate play *during*

work activities to transform their experience of work, which resonates with recent advances on individual work design strategies such as job crafting (Tims et al., 2012). Contrasting top–down initiatives that utilize a "one size fits all" approach, self-initiated play may cater more to individual needs.

Second, we answer calls for the development of a generic instrument to measure play during work (Petelczyc et al., 2018; Van Vleet and Feeney, 2015). We conceptualize and advance a two-dimensional instrument with sound psychometric qualities that measures play during work to systematically test and refine theories regarding play at work. Moreover, while play theorists often characterize play along two different dimensions, attention is usually devoted to only one of the manifestations of play. The two-dimensional conceptualization of playful work design (PWD) answers calls for the differentiation between types of play (Petelczyc et al., 2018). Furthermore, a two-dimensional approach distinguishing between "designing fun" and "designing competition" offers an enhanced understanding of the nuanced differences between these forms of play compared with a one-dimensional approach. That is, the idiosyncratic nature and differential focus of these play forms suggests they may cater to different personal needs as well as benefit distinct work conditions (e.g. Bakker et al., 2020a; Petelczyc et al., 2018; Scharp et al., 2019, 2021).

Finally, we extend contemporary theorizing and empirical research on PWD in several ways. First, we highlight the theoretical similarities and differences with other play initiatives and self-initiated work design strategies to position PWD in the literature as a related, but unique concept. In consideration of the novelty of PWD, the purpose of this article was to build on the theoretical narratives that are dominant in research on play (e.g. personality, energies) and self-initiated work design (e.g. promotion- vs. prevention-focus, energies, performance behaviors). Second, we aim to extend previous research on PWD that has mainly revealed how intraindividual differences in PWD, motivational states, and performance behaviors are interrelated (Scharp et al., 2019, 2021). In contrast, the present study aims to reveal how individuals who design work to be more playful differ from their less playful counterparts in terms of traits, enduring motivational states, and performance. Third, while previous research has mainly relied on self-ratings of work engagement and performance behaviors (Bakker and van Wingerden, 2021; Scharp et al., 2019, 2021), the present study also investigates how PWD relates to colleague-ratings of their engagement and performance (e.g. creative performance, effort). Furthermore, we test the often-formulated propositions regarding the antecedents as well as consequences of play during work. That is, play is often conceptualized as a manifestation of certain personality traits, promotion-focused, an energy-management strategy stimulating positive affect, and promoting performance behaviors such as creativity and effort (Barnett, 2007; Celestine and Yeo, 2001; Csikszentmihalyi, 1981; Huizinga, 1949; Lieberman, 2014; Mainemelis and Ronson, 2006; Peterson and Seligman, 2004; Proyer, 2012).

The foundation for playful work design

Play paradigms

Play has been a topic of debate across a multitude of disciplines ranging from anthropology, sociology, history, biology, to psychology (Sutton-Smith, 2009). Overall, we can

roughly discern three major themes or "paradigms" in the research on play where (1) play is approached as a set of activities or behaviors, (2) play is considered an individual characteristic, or (3) play is defined as a behavioral approach to an activity. First, the stream of research that approaches "play-as-activities" situates play as a consequence and/or characteristic of certain activities and behaviors (e.g. Caillois, 2001; Huizinga, 1949). For instance, utilizing a multidimensional scaling method, Day (1981) positioned activities on a continuum ranging from "workfulness" (e.g. algebra, dishes, taking out the garbage) to playfulness (e.g. dances, parties, being with friends). Similarly, Van Vleet and Feeney (2015) defined play as activities or behaviors carried out for fun with a high amount of enthusiasm and interactivity (e.g. dancing together, Nerf gun shoot-outs, mock wrestling). Second, the play-as-personality stream of research approaches play as a manifestation of individual differences in specific tendencies or capacities (e.g. Barnett, 2007; Helmreich and Spence, 1978; Lieberman, 2014; Peterson and Seligman, 2004; Thorson and Powell, 1993). For instance, Proyer (2012, 2017) described playfulness as an individual characteristic that enables individuals to (re)frame situations for the purpose of entertainment and stimulation, which builds on the tendencies to be other-directed, lighthearted, intellectual, and whimsical. Finally, the play-as-approach stream of research defines play as a specific way of structuring cognition and behavior in relation to an activity (e.g. Abramis, 1990; Andersen and Roepstorff, 2021; Apter, 1991; Csikszentmihalyi, 1981; Miller, 1973). In other words, play is not considered as a "set of activities but rather a behavioral approach to performing any activity" (Mainemelis and Ronson, 2006: 84). For example, Hamilton et al. (1984: 184) described how individuals play during activities such as mowing the lawn by "discovering game-like qualities in the task itself and by creating rules about what one is doing and how to do it: pretending one is 'mowing down' something besides grass, inscribing circular or zig-zag patterns". The paradigms provide complementary and unique insights into what may constitute play during work and its nomological net.

Play communalities

While the play paradigms differ in their approach of researching play, their findings converge in their description of the core features: (1) cognitive recategorization of behaviors or activities as "play"; (2) a process-orientation described by a momentary focus on the behavior or activity; (3) a sense of freedom and volition; (4) interactive involvement in terms of seeking, finding, and resolving surprises and complexities; and (5) the autotelic nature, that is, performed for the sake of the associated positive affective states (Andersen and Roepstorff, 2021; Bateson, 1972; Csikszentmihalyi, 1975; Proyer, 2017; Van Vleet and Feeney, 2015). In support of their unity, the constellation of the core features of play appears to synchronize in harmony. The presence or absence of features stimulates or inhibits the prevalence of other features. For instance, experiments reveal that framing tasks as "play" transforms their experiential qualities; it suspends the instrumental, efficiency-oriented qualities of a task, and promotes an intrinsic, process-oriented mindset and positive affective states (Cellar and Barrett, 1987; Glynn, 1994; Heimann and Roepstorff, 2018; Sandelands, 1988; Webster et al., 1990). Similarly, a game of monopoly or a soccer match becomes dull and performative after the outcome

becomes unequivocal (e.g. who will win) and more focused on the outcome (e.g. to finish the game) as opposed to the process (Andersen and Roepstorff, 2021). Likewise, forcing an individual to participate in play may create cynicism and minimize the autotelic nature and cognitive recategorization (Fleming, 2005). Finally, when individuals do not "get" a joke or are unable to solve a puzzle; they are unable to resolve surprises and complexities, which may yield confusion or frustration instead of fun and challenge (Suls, 1983). Taken together, the research on play suggests individuals play (1) when they possess specific traits or capacities, (2) when the situation signals the freedom to play, and (3) owing to the autotelic nature, that is, to optimize personal energetic and psychological resources (Celestine and Yeo, 2021; Petelczyc et al., 2018).

The duality of play

Another recurrent theme across the play literatures is the duality of play. Play is often characterized along two dimensions. Huizinga (1949) concluded that this duality is best described by the ancient Greek terms παιδιά (paidiā́), which means *ludic*, childish, and fun, and ἀγών (agṓn), meaning *agonistic*, contest, and competition. The play literature often appreciates this duality with different labels. Scholars may describe play in terms of open or closed, irrational or rational, playful or serious, imaginary or real, as well as arbitrary or rule-bound (Kolb and Kolb, 2010; Suits, 1978). Ludic play tends to be focused on deriving lighthearted pleasure and is characterized by "open" goals (the goal is to continue playing), non-seriousness, fantasy, and arbitrary rules. In contrast, agonistic play tends to be focused on creating pleasure from stretching one's skill and involves relatively structured behaviors such as competing and striving for achievements characterized by "closed" goals (i.e. goals whose achievement ends the play episode), seriousness, reality, and explicit rules. Naturally, these forms of play do not represent dichotomous manifestations. Instead, they may covary in harmony. Moreover, the duality of play applies to the play-as-activity, play-as-personality, and play-as-approach perspectives. For instance, ludic play activities may refer to dancing and jesting, whereas rock-climbing and basketball represent agonistic play activities. Similarly, humorous and lighthearted personalities represent ludic personalities, whereas the trait of competitiveness reflects an agonistic personality. Finally, in terms of play as a behavioral approach, individuals may restructure their cognition and behavior during activities in a ludic fashion with, for instance, using humor and imagination to derive fun while cooking; or in an agonistic fashion by, for example, creating objectives and rules to create pleasure from stretching one's skill while mowing the lawn.

Play as work design

The literature on play shares striking similarities with the literature on work design. Parker (2014) advanced a conceptualization of "work design" that not only includes the top–down organization of work (job design; Hackman and Oldham, 1976), but also employees' emergent and self-initiated organization of tasks and activities (individual work design). Similar to research on play as activities, the literature on top–down work design reveals how creating situational conditions such as autonomy and variety can

elicit motivation and behavior (Celestine and Yeo, 2021; Humphrey et al., 2007). Recently, research emerged on organizational initiatives that integrate play with top–down work design. For instance, fun activities at work and gamification represent top–down initiatives that aim to harness the autotelic nature of play. Fun activities include playful and humorous endeavors organized and sponsored by the organization to promote amusement, enjoyment, or pleasure such as theme days, public celebrations, productivity contests, and teambuilding events (Michel et al., 2019; Tews et al., 2014). Gamification aims to integrate game elements with non-game contexts (Deterding et al., 2011) such as introducing playful instructions and props during meetings (West et al., 2016), or developing a digital environment with leaderboards, badges, and awards (Silic et al., 2020). Indeed, such top–down initiatives appear to foster employee engagement and performance (Becker and Tews, 2016; Silic et al., 2020; Tews et al., 2014; West et al., 2016). However, as proposed by Parker (2014), individuals may also organize their tasks and activities themselves, which connects with the literature that defines play as a specific way of organizing one's cognition and behavior in relation to an activity.

Individual work design strategies represent a form of proactive behavior; self-started behavior focused on promoting change as opposed to passively accepting the status quo (Crant, 2000; Frese et al., 1997; Parker et al., 2006). While proactive behaviors share a common core of being action-oriented and goal-directed, their form, intended target of impact, and temporal orientation may vary extensively (Grant and Ashford, 2008). For instance, the form and target of impact of proactive behaviors may include taking personal initiative, preventing the reoccurrence of work problems, identifying new technologies for innovation, strategic scanning for potential issues to ensure organization–environment fit, and engaging in non-work activities to mobilize personal psychological resources (Parker and Collins, 2010; Op den Kamp et al., 2018). These behaviors illustrate how proactive behaviors may differ in their intended target of impact in terms of the organization or the self, and short- or long-term results (Grant and Ashford, 2008). For instance, personal initiative, identifying new technologies, and strategic scanning reflect proactive behaviors focused on creating changes that align with the organization's mission with a long-term orientation, whereas mobilizing personal psychological resources targets the individual's experience and has a short-term orientation. Finally, in a similar vein as the autotelic nature of play, work design strategies often focus on attaining positively valenced end-states (e.g. promotion-focus job crafting; Bindl et al., 2019; Laurence, 2010; Wrzesniewski and Dutton, 2001; Zhang and Parker, 2019). Contextualized to work, play as a cognitive-behavioral approach represents a specific individual work design strategy that (1) utilizes cognitive and behavioral restructuring to create change, (2) is short-term oriented (but can be enacted over longer periods of time), and (3) focuses on the self. This strategy contrasts fun activities and gamification in terms of agency and locus of enactment. Fun activities and gamification represent top–down initiatives, whereas play as an individual work design strategy is a bottom–up initiative. Furthermore, employees mainly engage with fun activities outside of their tasks (play as diversion from work), whereas play as an individual work design strategy is embedded in work (play as engagement with work; Mainemelis and Ronson, 2006).

Playful work design

The conceptualization of PWD synthesizes the literatures on play and individual work design. PWD represents a specific individual work design strategy that builds on play as a cognitive-behavioral orientation and the duality of play. Specifically, we define PWD as the proactive cognitive-behavioral orientation aimed at fostering fun and challenge during work activities through creating, seeking, and resolving surprises and complexities. PWD entails approaching work activities as ludic or agonistic play opportunities (i.e. cognitive recategorization) and performing them in a ludic or agonistic fashion (e.g. with humor and imagination or competitively, industriously) to attain positively valenced end-states (e.g. fun, challenge; i.e. promotion-focus). Thus, PWD represents a two-dimensional construct comprised of (1) ludic play, which we label as "designing fun", and (2) agonistic play, which we label as "designing competition".

Designing fun

When employees design fun, they approach and perform work with a ludic mindset using humor and imagination to foster amusement, entertainment, and fun during work activities. The conceptualization of designing fun builds upon research that describes how individuals utilize personal capacities such as humor and imagination to provide themselves (and possibly others) with lighthearted positive affect (Abramis, 1990; Barnett, 2007; Lieberman, 2014; Proyer, 2012; Robert and Wilbanks, 2012; Roy, 1959). When employees design fun, they may utilize several ludic play strategies such as ludic framing, using oneself as entertainment, imagining amusing narratives or interactions, and using humor (Logan, 1985; Robert and Wilbanks, 2012; Peterson and Seligman, 2004). By using fantasy and humor, individuals may temporarily suspend or expand features of the self or the situation; attributing "their own meanings to objects and behaviors" (Tegano, 1990: 1049). Thus, by constructing a playful narrative, perceiving amusing incongruities, or engaging in role-play, individuals may design fun in their work activities. To illustrate, Terkel (1974) interviewed a cashier who described ringing groceries as "playin' a piano" (1974: 376) and a server who compared work to performing as a ballerina on stage (1974: 393). Another example concerns a flight attendant who went viral after using humor to make flight safety fun for everyone involved by communicating the safety procedure as a rap (CBS, 2009).

Designing competition

Designing competition refers to when employees approach and perform work with an agonistic mindset characterized by formulating objectives and rules to foster diligence, challenge, and competition during activities. The conceptualization of designing competition builds on the literatures that describe how individuals cognitively and behaviorally restructure activities to derive pleasure from stretching their skills (Csikszentmihalyi, 1975; Hamilton et al., 1984; Howe, 2008; Miller, 1973). When employees design competition, they use play strategies such as agonistic framing, self-competition, and segmentation. By voluntarily elaborating tasks in a patterned way, individuals may design

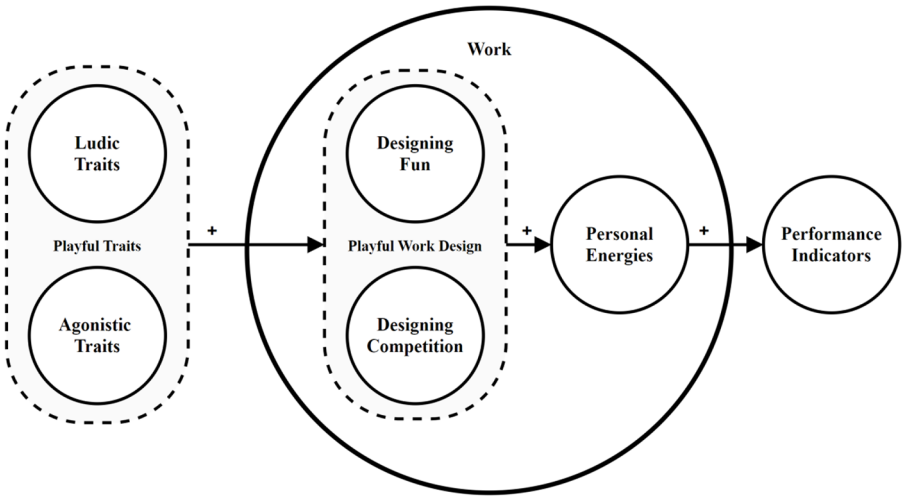

Figure 1. Conceptual model for the validation of the PWD instrument.

challenge in activities (Miller, 1973). Elaboration of tasks may involve setting small goals within tasks and segmenting tasks into meaningful parts (Fisher, 1993; Hill, 1975; Roy, 1959). For instance, self-competition involves competing with personal performance standards; aiming to stretch personal skills and pushing beyond personal limits (Howe, 2008). Thus, designing competition entails creating and finding opportunities to balance skill and challenge through agonistic play. For instance, Csikszentmihalyi (1975) describes an assembly line employee who exemplifies "designing competition". The employee maintained engagement with work throughout years of tenure by approaching and performing every task in a competitive fashion: "How do I beat my record?" (1975: 39). Likewise, an engaged bus driver described a game during rides; challenging oneself to drive as smoothly as possible with the least amount of sudden decelerations (Schaufeli et al., 2001).

Validation studies

Taken together, we expect that individuals (1) especially enact PWD when they possess playful and proactive traits, (2) particularly use PWD when the situation affords the freedom to use PWD, and (3) who use PWD enjoy more personal psychological resources and perform better than their non-playful counterparts. We further build on the differentiation between tendencies indicative of approaching desired end-states and avoiding undesired end-states, which reflect the two independent promotion and prevention motivational systems, respectively (Higgins, 2014). PWD is expected to correlate with tendencies associated with the promotion motivational system focused on "gains", whereas we hypothesize PWD will generally diverge from indicators of the prevention-motivational system focused on avoiding "losses". Figure 1 illustrates the overall conceptual model of PWD that guides our hypotheses.

Study 1: Scale construction and preliminary validity

Playful work design as proactivity and play

In Study 1, we develop an instrument that captures PWD in terms of ludic play (designing fun) and agonistic play (designing competition). In addition, we provide preliminary evidence for the scale's validity. First, PWD and personal initiative converge in their self-starting nature but diverge in their goal content (self vs. organizational) and time-orientation (i.e. short-term vs. long-term; Frese et al., 1997). Hence, we expect that designing fun (Hypothesis 1a) and designing competition (Hypothesis 1b) are distinct from, but correlate positively with, personal initiative. Building on the research that conceptualizes play as a manifestation of specific tendencies and capacities, we hypothesize that PWD correlates positively with general tendencies associated with play such as trait curiosity and trait openness. Curiosity describes the pursuit, recognition, and desire to explore novel, uncertain, complex, and ambiguous events (Kashdan et al., 2009). Likewise, individuals high in trait openness have the "recurrent need to enlarge and examine experiences" (McCrae and Costa, 1997: 826). Research suggests that individuals who possess these traits will strive to expand their experiences through play (Baumann et al., 2016; Berlyne, 1960; Guitard et al., 2005; Nakamura and Csikszentmihalyi, 2014; Proyer, 2012). Hence, we expect that designing fun correlates positively with trait curiosity (Hypothesis 2a) and trait openness (Hypothesis 2b). Similarly, we predict that designing competition relates positively to trait curiosity (Hypothesis 3a) and trait openness (Hypothesis 3b).

Designing fun as ludic play

Since designing fun and designing competition reflect ludic and agonistic play, respectively, we anticipate that designing fun and designing competition will correlate positively with ludic and agonistic traits (convergent validity); however, we further predict that designing fun correlates more strongly with ludic traits than designing competition and that designing competition correlates more strongly with agonistic traits than designing fun (divergent validity). While trait playfulness, trait humor, and creative personality represent ludic characteristics, competitiveness and achievement striving reflect agonistic characteristics. The conceptualization of trait playfulness builds on the ludic play literature and refers to "the predisposition to frame (or reframe) a situation in such a way to provide oneself (and possibly others) with amusement, humor, and/or entertainment" (Barnett, 2007: 955; Proyer, 2012). In a similar vein, humor is a character strength that refers to the capacity to make oneself and others laugh (Peterson and Seligman, 2004). Finally, trait creativity is considered to be a fundamental component of ludic play, reflective of the capacity for divergent thinking, which enables individuals to creatively approach and perform activities (Glynn and Webster, 1992; Guitard et al., 2005; Lieberman, 2014; see, for a review, Proyer et al., 2019). Taken together, we predict that designing fun correlates positively and more strongly than designing competition with trait playfulness (Hypothesis 4a), sense of humor (Hypothesis 4b), and trait creativity (Hypothesis 4c).

Designing competition as agonistic play

Since competitiveness and achievement striving represent agonistic traits they should especially correlate with designing competition. Trait competitiveness refers to having a strong desire to outperform others and frame situations as competitions (Hibbard and Buhrmester, 2010; Houston et al., 2002). The achievement striving facet of conscientiousness refers to the will to achieve and strive for excellence (Costa and McCrae, 1985). Competitiveness and achievement striving are closely related; however, competitiveness also focuses on others, whereas achievement striving is mainly self-centered (Moon, 2001). Hence, we expect that designing competition correlates positively, and more strongly than designing fun, with competitiveness (Hypothesis 5a) and achievement striving (Hypothesis 5b).

Divergent behavioral tendencies

Finally, we expect PWD to diverge from constructs reflective of the prevention-motivational system focused on avoiding losses such as procrastination and cynicism. The tendency to procrastinate refers to the propensity to put off work and avoid an activity under one's control (Tuckman, 1991), which reflects avoidance of negative emotions (Sirois and Pychyl, 2013). Cynicism refers to a negative, callous, and cynical attitude toward one's job characterized by distancing oneself from work (Leiter and Schaufeli, 1996). Typically, individuals develop cynical attitudes toward their work to avoid incurring further energetic losses (Maslach et al., 2001). We expect that the enactment of PWD operates independently from procrastination and cynicism. To illustrate, individuals who score low on procrastination may utilize PWD to "kick-start" their focal task, whereas procrastinators may employ PWD to avoid their focal task by playfully designing other work activities. Similarly, while individuals low in cynicism may initiate PWD to further expand their motivation, cynical individuals may also initiate PWD to protect their energies or as a strategy to further distance themselves from work and as a form of resistance (Rodrigues and Collinson, 1995). These opposing associations suggest that designing fun and designing competition diverge from procrastination and cynicism.

Method

Content validity, item generation, and reduction

Four experts (one professor in organizational psychology and three work design consultants) generated 75 items utilizing an inductive approach based on their knowledge of the subject matter and experiences with clients (DeVellis, 2016). All items were positively keyed since reverse-scored items reduce validity, introduce systematic error, and may cause an artifactual response factor consisting of all negatively worded items (Hinkin, 1995). Experiences with clients comprised workshop exercises and interviews on the use of play during work to make tasks more fun and challenging. During the next round, we selected and reformulated 39 items to ensure that the final item pool consisted of statements that indicated to what extent employees proactively integrated play with work with commonly described play elements (e.g. humor, fantasy, narrative, competition,

challenges, rules; Caillois, 2001; Csikszentmihalyi, 1975; Huizinga, 1949; Lieberman, 2014). A panel of six Work and Organizational psychologists was provided with the following description of PWD: "Playful work design is a proactive employee strategy of using imagination and behavior to make work more challenging and fun." The panel evaluated and scrutinized the item pool based on clarity and construct validity. Specifically, they were instructed to rate items in terms of clarity, unambiguity, and conciseness on a five-point scale (1 = *bad quality*, 5 = *good quality*). We retained items with a high degree of consensus and minor comments ($n = 26$; $M = 4.33$). Finally, we formulated several new items based on the feedback ($n = 6$), which resulted in a total set of 32 items for the exploratory factor analyses.

Procedure and participants

Participants were recruited through social media and the personal network of the authors. We informed participants of the general purpose of the study, that they could withdraw at any time, and that their responses were completely confidential. To incentivize participants, they could win a wireless headset worth 50 euros. In total, 428 Dutch employees participated. The sample consisted of 262 men (61.2%) and 166 women (38.8%). On average, participants were 40.42 years of age ($SD = 12.62$), worked 46.33 hours a week ($SD = 16.20$), and worked 12.97 years in their current job ($SD = 11.75$). Most of our sample received vocational training (40.2%) or finished high school (25.2%). Participants worked in a variety of sectors such as trade (41.8%), healthcare (15.4%), education (9.8%), industry (7.9%), and business services (7.2%). The participants rated the 32 items on a five-point scale (1 = *never*, 5 = *very often*).

Measures

In addition to the 32 newly developed items to measure PWD, we included various scales to establish preliminary evidence of construct validity. Statements were rated on a five-point scale unless stated otherwise (1 = *strongly disagree*, 5 = *strongly agree*).

Proactivity. We measured proactivity with the seven-item Self-reported Initiative Questionnaire (Frese et al., 1997). An example item is: "I actively attack problems."

General play traits. We measured trait curiosity and trait openness. Curiosity was measured with the 10-item Curiosity and Exploration Inventory-II (Kashdan et al., 2009). Respondents rated statements such as: "I am the kind of person who embraces unfamiliar people, events, and places" (1 = *not at all*, 5 = *extremely*). The 10-item Openness to Experience Scale of the Big Five Inventory was used to measure openness (John et al., 2008). One example item is: "I see myself as someone who is ingenious."

Ludic traits. We used instruments that measure trait playfulness, humor, and creative personality. We measured trait playfulness with the five-item Short Measure of Playfulness (Proyer, 2012). Example items are: "I am a playful person" and "Good friends would describe me as a playful person" (1 = *strongly disagree*, 7 = *strongly agree*). Humor was

measured with the nine-item Humor Scale of the Values in Action Inventory of Strengths (Peterson and Seligman, 2004). An example item is: "I use laughter to brighten the days of others" (1 = *very uncharacteristic*, 5 = *very characteristic*). We used the four-item Creative Personality Scale to measure creative personality (Gough, 1979; Zhou, 2003). Respondents rated items such as: "I am inventive."

Agonistic traits. Competitiveness was measured with the five-item competition subscale of the Work and Family Orientation questionnaire (Helmreich and Spence, 1978). An example item is: "feel that winning is important in both work and games". We measured the achievement striving facet of conscientiousness with the 10-item achievement striving subscale from the NEO Personality Inventory (Costa and McCrae, 1992). An example item is: "I plunge into tasks with all my heart."

Divergent behavioral tendencies. We used measures of procrastination and cynicism to assess divergent validity. We measured procrastination with eight of the highest loading items of the Procrastination Scale (Tuckman, 1991), such as: "I am an uncurable time waster." We used the four-item cynicism subscale from the Maslach Burnout Inventory to measure cynicism (Maslach et al., 1986). An example item is: "I doubt the significance of my work" (1 = *never*, 7 = *always*).

Results

Exploratory factor analyses

The 32 items were used in iterative exploratory factor analyses (EFA) using principal component analysis and oblique rotation (promax). Oblique rotation was chosen because the hypothesized factors, designing fun and designing competition, represent correlated facets of the higher-order latent PWD construct. To ensure content validity and avoid redundancy, we removed items that did not distinctly load on their intended dimension, showed substantial overlap with other items, or created aberrant deviations from the two-factor structure. In addition, to ensure a concise and parsimonious instrument, we utilized an iterative approach where we inspected Eigenvalues (> 1), cross-loadings ($< .35$), overlap, and content validity of the statements to add and remove items (Osborne et al., 2008). An iterative approach to the factor analysis was deemed most appropriate in consideration of the novelty of the construct, need for a parsimonious meaningful instrument, and lack of empirical studies to draw items from.

In total, the iterative procedure identified 12 items that loaded distinctively on their expected factor and mirrored the proposed two-dimensional nature of PWD (see Table 1). The factor loadings ranged from .43 to .80 and none of the cross-loadings exceeded .27. The first factor described ludic play during work, which we refer to as *designing fun*, and explained 34.39% of the variance (Eigenvalue = 4.13; alpha reliability coefficient = .75). The second factor consisted of items that measure agonistic play during work, which we label as *designing competition*, and explained an additional 10.20% of the variance (Eigenvalue = 1.22). In addition to the alpha reliability coefficients (α), we calculated the omega reliability coefficients (ω) for each PWD

Table 1. Items, means, standard deviations, alphas, and standardized factor loadings of the PWD scale (Study 1, $N = 428$).

							Factor loading	
	M	*SD*	Skew	Kurtosis	$\rho_{XiR(i)}$	α	1.	2.
Designing fun						.75		
1. I look for humor in the things I need to do.	3.60	1.01	−.68	.17	.51		.80	
2. I approach my work in a playful way.	3.19	1.01	−.52	−.17	.51		.80	
3. I look for ways to make tasks more fun for everyone involved.	3.52	.99	−.60	.29	.49		.64	
4. I approach my tasks creatively to make them more interesting.	3.50	.90	−.58	.50	.49		.60	
5. I look for ways to make my work more fun.	3.24	.99	−.60	.08	.49		.54	
6. I use my imagination to make my job more interesting.	2.49	1.18	.16	−1.10	.47		.46	
Designing competition						.73		
7. I try to set time records in my work tasks.	2.98	1.23	−.23	−1.03	.43			.80
8. I try to keep score in all kinds of work activities.	2.61	1.13	.04	−1.04	.43			.73
9. I compete with myself at work, not because I have to, but because I enjoy it.	3.11	1.20	−.34	−.78	.55			.69
10. I try to make my job a series of exciting challenges.	2.79	1.08	−.17	−.79	.55			.55
11. I push myself to do better even when it isn't expected.	3.97	.73	−.66	1.10	.35			.48
12. I approach my job as a series of exciting challenges.	3.20	1.09	−.49	−.44	.47			.43

Factor loadings $> .35$ are shown. The original Dutch items were translated into English. Items were rated on a five-point scale (1 = *never*, 5 = *very often*). $P_{XiR(i)}$ = corrected item-total correlation.

subdimension based on maximum likelihood estimation of factor loadings and error variances (Hayes and Coutts, 2020). The reliabilities of the designing fun ($\alpha = .75$, $\omega = .75$) and designing competition scale were acceptable ($\alpha = .73$, $\omega = .74$). The item means vary between 2.61 and 3.97 ($\bar{x} = 3.18$), which suggests most individuals occasionally engage in PWD. The absolute values of the skewness and kurtosis indices did not exceed 1.1, which indicates the items are normally distributed (Kline, 1998). The designing fun and designing competition subscales were intercorrelated ($r = .56$, $p < .01$; see Table 1).

Table 2. Means, standard deviations, reliabilities (between brackets), and correlations of the variables (Study 1, $N = 428$).

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Designing fun	3.26	.68	(.75)											
2. Designing competition	3.11	.71	.56**	(.73)										
3. Personal initiative	4.07	.56	.36**	.42**	(.81)									
4. Curiosity	3.62	.71	.42**	.46**	.47**	(.88)								
5. Openness to experience	3.54	.54	.40**	.31**	.39**	.51**	(.73)							
6. Playfulness	4.38	1.25	.45**	.18**	.20**	.28**	.33**	(.87)						
7. Humor	3.80	.54	.41**	.13**	.24**	.31**	.28**	.53**	(.80)					
8. Creative personality	3.75	.60	.36**	.24**	.41**	.38**	.62**	.30**	.29**	(.72)				
9. Competitiveness	2.82	.95	.21**	.47**	.28**	.36**	.19**	.12*	.04	.16**	(.85)			
10. Achievement striving	4.18	.54	.22**	.34**	.65**	.42**	.34**	.10*	.18**	.34**	.30**	(.83)		
11. Procrastination	1.98	.83	−.01	−.01	−.27**	−.09	−.04	.13**	.01	−.10*	.01	−.43**	(.90)	
12. Cynicism	2.18	1.07	−.08	−.13**	−.27**	−.15**	−.08	−.06	−.11*	−.13**	−.03	−.28**	.26**	(.84)

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

Validity evidence

Table 2 presents the means, standard deviations, reliabilities, and correlations of the variables. We predicted that designing fun (Hypothesis 1a) and designing competition (Hypothesis 1b) would correlate positively with personal initiative. In support of Hypothesis 1, personal initiative associated positively with designing fun ($r = .36$, $p < .01$) and designing competition ($r = .36$, $p < .01$). Hypothesis 2 states that designing fun (a) and designing competition (b) correlate positively with the trait of curiosity. Indeed, trait curiosity was positively correlated with designing fun ($r = .42$, $p < .01$) and designing competition ($r = .46$, $p < .01$). Finally, we hypothesized that designing fun (Hypothesis 3a) and designing competition (Hypothesis 3b) would relate positively to trait openness. As expected, designing fun ($r = .40$, $p < .01$) and designing competition ($r = .31$, $p < .01$) correlated positively with trait openness. Taken together, the results indicate that individuals with proactive and playful tendencies tend to design fun and design competition.

Hypothesis 4 states that designing fun would correlate positively, and more strongly than designing competition, with trait playfulness (a), humor (b), and creative personality (c). To compare the strength of the correlations, we calculated two-tailed 95% confidence intervals of the differences (Zou, 2007). The strength of the correlations significantly differs in size when the confidence interval excludes zero. Indeed, the positive correlations between designing fun and playfulness ($r = .45$, $p < .01$; LL: 0.19, UL: 0.35), humor ($r = .41$, $p < .01$; LL: .20, UL: .36), and creative personality ($r = .36$, $p < .01$; LL: .04, UL: .20) were stronger than the associations between designing competition and the respective ludic traits (Table 2). In contrast, we predicted that designing

competition would correlate positively, and more strongly than designing fun, with trait competitiveness (Hypothesis 5a) and achievement striving (Hypothesis 5b). Indeed, the correlations of designing competition with competitiveness ($r = .44$, $p < .01$; LL: .18 UL: .34) and achievement striving ($r = .34$, $p < .01$; LL: .04, UL: .20) were stronger than the associations between designing fun and the agonistic traits (Table 2). These findings support the conceptualization of designing fun and designing competition as ludic and agonistic play, respectively.

We expected that PWD diverged from procrastination and cynicism. Designing fun neither correlated with procrastination ($r = -.01$, $p = .963$) nor cynicism ($r = -.08$, $p = .088$). Likewise, designing competition did not relate to procrastination ($r = -.01$, $p = .859$); however, designing competition did show a small negative correlation with cynicism ($r = -.13$, $p < .05$).

Discussion

The two-dimensional factor structure that emerged from iterative exploratory factor analyses mirrored the duality of play, which we labeled designing fun and designing competition. Further supporting this distinction, designing fun especially correlated with ludic traits (i.e. playfulness, humor, creative personality), whereas designing competition was especially related to agonistic traits (i.e. competitiveness, achievement striving). As hypothesized, both dimensions converged similarly with personal initiative and general traits associated with play (i.e. curiosity, openness), which supports the conceptualization of PWD as an integration of play and proactivity during work. Finally, PWD diverged from constructs reflective of withdrawal and avoidance – suggesting PWD is indicative of a different motivational system. Taken together, the findings support the two-dimensional conceptualization of PWD as behavior reflective of proactive ludic play and proactive agonistic play during work.

Study 2: Cross-validation and additional validity evidence

Playful work design vs. job crafting

Study 2 aims to cross-validate the two-dimensional factor structure of the PWD instrument (Hypothesis 6) and provide further construct validity. Job crafting is an important construct to consider in relation to PWD. Job crafting can be defined as self-initiated changes in job demands and job resources (Petrou et al., 2012; Tims et al., 2012). Such proactive efforts can also be conceptualized as contraction (prevention/avoidance-oriented) and expansion (promotion/approach-oriented) of the task, cognitive, skill, and relational boundaries of the job (Bindl et al., 2019; Laurence, 2010; Wrzesniewski and Dutton, 2001; Zhang and Parker, 2019). In contrast, PWD does not involve changing job resources or job demands. PWD also does not promote change through expansion or contraction of the scope of the job. PWD creates change by proactively restructuring cognition and behavior *during existing* work activities. To illustrate, a cashier who crafts their job may seek out or drop certain tasks by asking to be responsible for the bookkeeping or by exchanging their cleaning task with a colleague; try to get to know or avoid

certain colleagues; and, focus on how the supermarket ensures that individuals in society have easy access to food or channel attention away from tasks that involve wasting food. These behaviors exemplify self-initiated changes in job demands and job resources as well as expansion and contraction of the boundaries of the job (Bindl et al., 2019; Tims et al., 2012). In contrast, a cashier who designs work to be more playful may imagine an amusing narrative for the item list of each customer (to create fun) and try to scan articles as fast as possible (to create challenge). The cashier does not aim to modify the boundaries of their obligations, relations, and meaning of the job; the aim is to redesign the experience to be more fun and challenging by integrating play with work within the boundaries of the activities. Hence, we argue PWD is distinct from job crafting owing to the differences in content and how the behaviors realize change (discriminant validity; Hypothesis 7). However, PWD and job crafting overlap in terms of self-started changes to optimize work conditions (convergent validity). Hence, we argue that designing fun correlates positively with increasing structural resources (Hypothesis 8a), increasing social resources (Hypothesis 8b), and increasing challenge job demands (Hypothesis 8c). Likewise, Hypothesis 9 states that designing competition is positively associated with increasing structural resources (Hypothesis 9a), increasing social resources (Hypothesis 9b), and increasing challenge job demands (Hypothesis 9c).

Convergent behavioral tendencies

We expect that when individuals design fun and design competition, they frame and perform activities with a ludic and agonistic orientation, which builds on an individual's mental capacities and flexibility (Csikszentmihalyi, 1975; Lieberman, 2014). Imagination refers to the mental capacity to simulate certain activities and experiences (Taylor et al., 1998). When individuals design fun or competition, they may utilize their imagination to frame and approach activities in a ludic (e.g. as a theatrical performance) or agonistic (e.g. as a challenging puzzle) fashion. Hence, we expect that imagination correlates positively with designing fun (Hypothesis 10a) and designing competition (Hypothesis 10b). Behavioral rigidity refers to the tendency to maintain the status quo and avoid unknown activities (Lynam et al., 2012). This tendency stands in stark contrast with PWD, which revolves around self-initiating changes to create surprises, uncertainties, and complexities. Hence, Hypothesis 11 states that behavioral rigidity correlates negatively with designing fun (Hypothesis 11a) and designing competition (Hypothesis 11b).

Convergent job characteristics

Finally, as mentioned in the preceding paragraphs, PWD is embedded in activities. The characteristics of these activities may promote or limit the opportunities to playfully design work (Celestine and Yeo, 2021; Mainemelis and Ronson, 2006). Autonomy and supervision support for play provide employees with the latitude to playfully design work. Job autonomy refers to the degree of freedom, independence, and discretion (Morgeson and Humphrey, 2006). Since higher levels of autonomy afford individuals with more play opportunities, we anticipate that designing fun (Hypothesis 12a) and designing competition (Hypothesis 12b) correlate positively with autonomy. Likewise,

supportive supervision may stimulate PWD by signaling that play is permissible (Celestine and Yeo, 2021; Petelczyc et al., 2018). Hence, we predict experience support for fun will correlate positively with (Hypothesis 13a) designing fun and (Hypothesis 13b) designing competition.

Divergent behavioral tendencies

We expect PWD to manifest independently from constructs that reflect avoidance such as laziness. Similar to procrastination, laziness reflects an unwillingness to engage in and an avoidance of work (Costa and McCrae, 1985). Hence, we expect laziness to diverge from designing fun and designing competition.

Playful work design and energy management

Play theory suggests that individuals initiate play to expand and recuperate their energetic resources (Berlyne, 1960; Celestine and Yeo, 2021; Ellis, 1973; Giddens, 1964; Magnuson and Barnett, 2013; Spencer, 1870). The affective-energetic states of employees can be described by work engagement, exhaustion, and job boredom (Schaufeli and Salanova, 2014). Work engagement is a positive, work-related state of mind characterized by vigor, dedication, and absorption (Schaufeli and Bakker, 2010). In contrast, exhaustion refers to a feeling of fatigue owing to excessive demands (Maslach et al., 1986). Finally, job boredom reflects a lack of energetic resources and passiveness owing to an unstimulating environment (Reijseger et al., 2013). In other words, engagement, exhaustion, and boredom reflect the employees' energetic reservoir. Therefore, we anticipate that designing fun (Hypothesis 14a) and designing competition (Hypothesis 14b) correlate positively with work engagement. In contrast, we expect that employees who design fun (Hypothesis 15a) and design competition (Hypothesis 15b) are generally less exhausted. Similarly, we expect that employees who design fun (Hypothesis 16a) and design competition (Hypothesis 16b) are less bored with their work.

Method

Procedure and participants

We recruited Dutch employees by posting (digital) flyers on social media channels (e.g. LinkedIn, Facebook). Participants were first informed of the general purpose of the study, the confidentiality of their responses, and that participation was voluntary. As an incentive, respondents could win a wireless headset worth 60 euros. We recruited 302 participants, which consisted of 164 women (54.3%) and 138 men (45.7%). Respondents had a mean age of 43.46 years old (SD = 11.70), workweek of 42.07 hours (SD = 15.00), and job tenure of 14.45 years (SD = 11.95). Most participants received vocational training (32.5%) or higher professional education (32.1%). Participants worked in a variety of sectors, including transport (33.1%), healthcare (29.1%), education (16.2%), and business services (7.9%).

Material

All statements were rated on a five-point scale (1 = *strongly disagree*, 5 = *strongly agree*), unless stated otherwise.

Playful work design. PWD was measured with the newly developed 12-item PWD questionnaire from Study 1 (see Table 1).

Job crafting. We measured three job crafting behaviors with the Job Crafting Questionnaire (Tims et al., 2012). Each scale consists of five items. Example items are: "I try to develop myself professionally" (increasing structural job resources), "I ask colleagues for advice" (increasing social job resources), and "When an interesting project comes along, I offer myself proactively as project co-worker" (increasing challenging job demands). Items were rated on a five-point scale (1 = *never*, 5 = *very often*).

Convergent measures. We measured imagination, rigidity, support for fun, and autonomy as general antecedents of play. We used a six-item scale to measure imagination (Costa and McCrae, 1992). Respondents rated items such as: "I feel like my imagination can run wild." Rigidity was measured with the seven-item Behavioral Rigidity Scale (Lynam et al., 2012). An example statement is: "I am very predictable." We measured manager support for fun with the five-item Manager Support for Fun Scale (Tews et al., 2014). An example item is: "My managers try to make my work fun." We used three items to measure job autonomy (Bakker et al., 2003), including: "I can decide myself how I execute my work" (1 = *totally disagree*, 7 = *totally agree*).

Divergent measures. Laziness was measured with the five-item Laziness Scale (Costa and McCrae, 1992). An example item is: "I tend to be lazy."

Criterion measures. We measured work engagement, job boredom, and exhaustion (1 = *never*, 7 = *always*). The nine-item Utrecht Work Engagement Scale was used to measure work engagement (Schaufeli et al., 2006). An example item is: "At my work, I feel bursting with energy." Job boredom was measured with the eight-item Boredom Scale (Reijseger et al., 2013). Participants rated how frequent statements such as: "I feel bored at my job" applied to them. We measured exhaustion with the five-item exhaustion subscale from the Utrecht Burnout Scale (Schaufeli et al., 1996). An example item is: "I feel mentally exhausted by my work."

Results

Confirmatory factor analyses

To cross-validate the two-factor structure from Study 1 (Hypothesis 6), we conducted a confirmatory factor analysis with maximum likelihood estimation using Mplus (Muthén and Muthén, 1998–2017). Model fit was assessed with the chi-square/*df* ratio (χ^2/df), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of

Table 3. Confirmatory factor analyses for PWD and job crafting (Study 2, $N = 302$).

Model	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA	SRMR	Comparison	$\Delta\chi^2$	Δdf
PWD										
1. 1-factor model	195.95	54	3.63	.858	.826	.061	.061			
2. Proposed 2-factor model	129.41	53	2.44	.923	.905	.069	.048	1 vs. 2	66.54**	1
PWD and job crafting										
3. Proposed 5-factor model	654.09	314	2.08	.903	.891	.059	.052			
4. 1-factor model	1287.46	324	3.97	.717	.693	.099	.083	3 vs. 4	633.37**	10
5. 2-factor model (PWD, JC)	921.78	323	2.85	.824	.809	.078	.061	3 vs. 5	267.69**	9
6. 4-factor model (DF and STR)	940.96	318	2.96	.818	.798	.081	.071	3 vs. 6	286.87**	4
7. 4-factor model (DF and SOC)	954.91	318	3.00	.813	.793	.081	.072	3 vs. 7	300.82**	4
8. 4-factor model (DF and CHA)	876.68	318	2.76	.836	.819	.076	.068	3 vs. 8	222.59**	4
9. 4-factor model (DC and STR)	885.85	318	2.79	.833	.816	.077	.069	3 vs. 9	230.76**	4
10. 4-factor model (DC and SOC)	890.35	318	2.80	.832	.814	.077	.071	3 vs. 10	236.26**	4
11. 4-factor model (DC and CHA)	823.77	318	2.59	.851	.836	.073	.065	3 vs. 11	169.68**	4

*$p < .05$; **$p < .01$. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual. PWD = playful work design; JC = job crafting; DF = designing fun; DC = designing competition; STR = increasing structural job resources; SOC = increasing social job resources; CHA = increasing challenge job demands.

Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). These fit indices indicate acceptable fit when the χ^2/df ratio is lower than three (Kline, 1998), TLI and CFI values exceed .90, and RMSEA and SRMR values are lower than .08 (Hu and Bentler, 1999). In support of Hypothesis 8, the findings indicate that two-factor model sufficiently fits the data ($\chi^2 = 129.41$, $df = 53$, CFI = .923, TLI = .905, RMSEA = .069, SRMR = .048), whereas the one-factor model fitted less adequately to the data ($\chi^2 = 195.95$, $df = 54$; $\Delta\chi^2 = 66.54$, $\Delta df = 1$, $p < .01$, CFI = .858, TLI = .826, RMSEA = .093, SRMR = .061). The standardized factor loadings of the two-factor model were statistically significant and ranged from .39 to .75 ($p < .01$). Similar to Study 1, designing fun ($\alpha = .80$, $\omega = .80$) and designing competition ($\alpha = .75$, $\omega = .76$) were intercorrelated ($r = .59$, $p < .01$) and sufficiently reliable (see Table 2).

To assess whether we can distinguish PWD from job crafting (Hypothesis 7), we performed a series of confirmatory factor analyses (see Table 3). The hypothesized measurement model consisted of five latent factors: designing fun, designing competition, increasing structural job resources, increasing job social resources, and increasing job

Table 4. Means, standard deviations, reliabilities (between brackets), and correlations between the variables (Study 2, $N = 302$).

	M	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Designing fun	3.24	.75	(.80)												
2. Designing competition	3.01	.74	.59**	(.75)											
3. Structural crafting	3.63	.80	.43**	.44**	(.79)										
4. Social crafting	2.32	.87	.40**	.43**	.62**	(.84)									
5. Challenge crafting	2.66	.97	.49**	.52**	.67**	.65**	(.83)								
6. Imagination	2.19	.94	.22**	.23**	.00	.12**	.14*	(.85)							
7. Behavioral rigidity	2.70	.62	−.23**	−.22**	−.25**	−.15**	−27**	−.09	(.64)						
8. Job autonomy	5.21	1.34	.17**	.23**	.44**	.21**	.29**	−.05	−.19**	(.81)					
9. Support for fun	3.21	1.04	.23**	.21**	.34**	.40**	.24**	.01	−.10	.46**	(.92)				
10. Laziness	1.84	.58	−.01	−.11	−.21**	−.11	−.15*	.36**	.16**	−.14**	−.15*	(.63)			
11. Work engagement	5.09	1.08	.30**	.36**	.54**	.41**	.36**	−.08	−.20**	.43**	.46**	−.03	(.92)		
12. Job boredom	1.80	.73	.02	.04	−.19**	−.06	.00	.42**	.05	−.27**	−.28**	.20**	−.47**	(.86)	
13. Exhaustion	2.75	1.09	.01	−.07	−.17**	−.03	−.06	.22**	.24**	−.31**	−.17**	.11	−.45**	.41**	(.91)

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

challenges. The PWD dimensions consisted of six items each, whereas the three job crafting dimensions consisted of five items each. The hypothesized five-factor model showed an acceptable fit to the data ($\chi^2 = 645.09$, $df = 314$, CFI = .903, TLI = .891, RMSEA = .059, SRMR = .052). In addition, we compared the five-factor model with various alternative models such as a model assuming that items indicating designing competition and increasing challenge job demands refer to one underlying "increasing challenges" dimension (Model 11). However, none of the alternative models improved model fit beyond the original, five-factor model. Hence, we conclude that designing fun and designing competition are distinct and discernable from the dimensions of job crafting.

Convergent validity

Table 4 presents the descriptive statistics of the variables. It is important to note the low reliability of the behavioral rigidity and laziness scales, which may have limited the validity of the associations. We hypothesized that PWD would relate positively to job crafting (Hypothesis 8 and 9). Indeed, designing fun and designing competition, respectively, correlated positively with increasing social job resources ($r = .41$, $p < .01$ and $r = .43$, $p < .01$), increasing challenge job demands ($r = .49$, $p < .01$ and $r = .52$, $p < .01$), and increasing structural job resources ($r = .43$, $p < .01$ and $r = .44$, $p < .01$). We further predicted PWD to relate positively to imagination (Hypothesis 10) and negatively to behavioral rigidity (Hypothesis 11). As expected, imagination correlated positively with designing fun ($r = .22$, $p < .01$) and designing competition ($r = .23$, $p < .01$); and behavioral rigidity

correlated negatively with designing fun ($r = –.23$, $p < .01$) and designing competition ($r = –.22$, $p < .01$). In other words, employees who use PWD tend to be proactive and somewhat more imaginative and less rigid in their behavior. Finally, we expected PWD to be more prevalent in settings characterized by autonomy (Hypothesis 12) and support for fun (Hypothesis 13). Indeed, autonomy correlated positively with designing fun ($r = .17$, $p < .01$) and designing competition ($r = .23$, $p < .01$); likewise, support for fun related positively to designing fun ($r = .23$, $p < .01$) and designing competition ($r = .21$, $p < .01$).

Divergent validity

We anticipated designing fun and designing competition to diverge from trait laziness. Neither designing fun ($r = –.01$, $p = .845$) nor designing competition ($r = –.11$, $p = .054$) correlated with laziness. These findings provide further evidence that PWD operates largely independently of the prevention-motivational system.

Criterion validity

We hypothesized PWD would correlate positively with work engagement (Hypothesis 14), and negatively with exhaustion (Hypothesis 15) and boredom (Hypothesis 16). As hypothesized, designing fun ($r = .30$, $p < .01$) and designing competition ($r = .36$, $p < .01$) correlated positively with work engagement. However, designing fun ($r = .01$, $p = .931$) and competition ($r = –.07$, $p = .244$) were not associated with exhaustion. Similarly, designing fun ($r = .02$, $p = .791$) and designing competition ($r = .04$, $p = .523$) were not associated with job boredom. Thus, while employees who use PWD generally feel more engaged, they do not experience less or more boredom and exhaustion than less playful counterparts.

Discussion

Study 2 replicated the two-dimensional factor structure found in Study 1. In addition, the confirmatory factor analyses revealed that PWD is distinguishable from job crafting. The correlations support the conceptualization of PWD as a form of proactive behavior and play, and suggest situational latitude promotes PWD. As expected, employees who design fun and design competition generally feel more engaged. However, contrary to our expectations, PWD did not correlate with exhaustion and job boredom. The energy management perspective of play may explain these findings (Celestine and Yeo, 2021). That is, on opposing ends of the continuum of exhaustion and boredom, employees may initiate PWD. Individuals who generally do not feel exhausted or bored may initiate PWD to expand their resources, whereas individuals who lack energetic resources may initiate PWD to recuperate.

Study 3: Longitudinal invariance and predictive validity

PWD and behavioral motivational systems

Study 3 further tests the psychometric robustness of the PWD instrument and provides additional validity evidence. Moreover, we examine the predictive power of the PWD

scales by temporally separating designing fun and designing competition from the outcome measures (i.e. self- and colleague-ratings). In addition, we will evaluate their incremental predictive power beyond job crafting, personal initiative, and fun activities. In the preceding paragraphs, we argued that PWD resonates with the promotion-motivational system but operates largely independent of the prevention-motivational system. These systems closely relate to the behavioral activation system (BAS) and behavioral inhibition system (BIS; Gray, 1990; Strauman et al., 2013). Carver and White (1994) argued that drive, reward responsiveness, and fun seeking characterize BAS, whereas concerns regarding potentially punishing events reflect BIS. Hence, Hypothesis 17 states that (a) drive, (b) reward responsiveness, and (c) fun seeking correlate positively with designing fun. However, we expect that BIS is not associated with designing fun. Hypothesis 18 specifies that (a) drive, (b) reward responsiveness, and (c) fun seeking relate positively to designing competition. In contrast, we expect that designing competition diverges from BIS.

PWD, energies, and performance behaviors

The energy management perspective of play proposes that play may enable employees to "build" energies that fuel work engagement, relational energy, and job effort (Celestine and Yeo, 2021). Relational energy encompasses energy derived from relational experiences (Owens et al., 2016). A colleague who restructures activities in a fun and challenging fashion may act as an energizer to colleagues (Neumann and Strack, 2000). Similarly, job effort is defined by time commitment and work intensity (Brown and Leigh, 1996). Since PWD involves actively restructuring activities to make them more engaging, we expect that colleagues will perceive employees who playfully design work activities to exert more effort. Thus, Hypothesis 19 describes a positive association between designing fun and (a) self-ratings of work engagement as well as colleague-ratings of (b) work engagement, (c) relational energy, and (d) job effort. Similarly, Hypothesis 20 states that designing competition positively relates to (a) self-ratings of work engagement as well as colleague-ratings of (b) work engagement, (c) relational energy, and (d) job effort.

Various disciplines endorse the idea that play fosters development through creating and resolving novelties and complexities (Clark, 2018; Piaget, 1962; White, 1959), which resonates with informal learning and creativity. Informal learning refers to self-initiated learning during work activities (Marsick and O'Neil, 1999; Noe et al., 2013). For instance, by cognitively and behaviorally restructuring work activities in a ludic and agonistic fashion, employees may learn the intricacies of tasks. Hence, PWD may offer employees unique insights that can be used to solve problems innovatively. Creative performance refers to the production of novel and appropriate responses, products, or solutions (Amabile and Mueller, 2008). Therefore, we expect that designing fun positively relates to colleague-ratings of informal learning (Hypothesis 21a) and creative performance (Hypothesis 21b). Likewise, we hypothesize that designing competition relates positively to colleague-ratings of informal learning (Hypothesis 22a) and creative performance (Hypothesis 22b).

The dark side of playful work design

Play initiatives have been criticized for incentivizing individuals to work excessively (Goggin, 2011) and as subversive to work according to values such as the Protestant

work ethic (Dandridge, 1986). We differentiate between behavioral overcommitment and psychological overcommitment. The former is operationalized by subtracting actual worked hours from contractual work hours, whereas the latter concerns a pattern of excessive dedication of resources to work and a high need for approval (Siegrist et al., 2004). Finally, when PWD behaviors are considered subversive, they might be perceived as idling behaviors. Idling behaviors (bored behaviors) refer to withdrawal behaviors during work to alleviate the adverse consequences of boring tasks such as working slower or spending time on non-work-related activities (Van Hooff and Van Hooft, 2014). Hence, Hypothesis 23 states that designing fun is positively associated with (a) psychological overcommitment, (b) behavioral overcommitment, and (c) colleague-ratings of idling behavior. Finally, Hypothesis 24 specifies that designing competition will positively relate to (a) psychological overcommitment, (b) behavioral overcommitment, and (c) colleague-ratings of idling behavior.

Method

Procedure and participants

Dutch employees were recruited through social media and (company) newsletters. We informed participants of the study purpose, research design, confidentiality of their responses, and that participation was voluntary. Respondents were eligible to participate if their colleagues were willing to participate and able to provide accurate observations. As an incentive, respondents received a 10 euro voucher or were enrolled in a raffle for a 20 euro voucher when they and their colleagues filled out the surveys. Participants answered a survey at Time 1 ($N = 276$) and roughly two weeks later at Time 2 ($N = 257$; 93.11%), whereas their colleagues filled out a single survey about the participants at Time 2 ($N = 227$; 82.24%). The panel group included 206 women (74.6%) and 70 men (25.4%). The mean age of the sample was 34.94 ($SD = 10.59$). On average, employees' contracts specified 32.73 hours a week ($SD = 8.52$), they worked an actual 37.30 hours a week ($SD = 9.23$), and organizational tenure was 6.06 ($SD = 7.14$). The majority of the sample had received a degree from an academic (55.4%) or applied sciences university (33.0%). The sample worked in a diverse set of occupational fields including education (29.7%), healthcare (22.1%), business services (17.4%), and governance (8.0%).

Measures

Statements were rated on a five-point scale unless stated otherwise (1 = *never*, 5 = *very often*).

Self-ratings

Playful work design. We assessed PWD with the 12-item scale developed in Study 1 and Study 2 at T1 and T2.

Proactivity. We measured two proactive behaviors at T1. We assessed Approach Crafting (Zhang and Parker, 2019) with the three job crafting behaviors described in Study 2 (Tims et al., 2012) and with the five-item scale optimizing demands crafting developed by Demerouti and Peeters (2018). An example statement of optimizing

demands crafting is: "I improve work processes or procedures to make my job easier." Finally, personal initiative was measured with the five-item scale described in Study 1 (Frese et al., 1997).

Fun activities. We used the five-item fun activities scale at T1 to assess play at work (Tews et al., 2014). A sample item is: "My employer organizes public celebrations of work achievements."

Behavioral approach and inhibition system. The behavioral approach (BAS) and inhibition system (BIS) were measured with the BIS/BAS scales at T2 (Carver and White, 1994). The scale includes five items to measure four items to assess drive (i.e. BAS; e.g. "When I want something, I usually go all-out to get it"), reward responsiveness (i.e. BAS; e.g. "It would excite me to win a contest"), four items to measure fun seeking (i.e. BAS; e.g. "I will often do things for no other reason than they might be fun"), and seven items to appraise behavioral inhibition (BIS; e.g. "I feel worried when I think I have done poorly at something"). All statements were rated on a seven-point scale (1 = *strongly disagree*; 7 = *strongly agree*).

Work engagement. We measured work engagement at T2 with the nine-item Utrecht Work Engagement Scale described in Study 2 (Schaufeli et al., 2006).

Dark side outcomes. We determined behavioral overcommitment by subtracting contractual work hours per week from actual work hours a week at T1. Second, we appraised psychological overcommitment with five items of the six-item overcommitment scale at T2 (Siegrist et al., 2004). Namely, we removed one item: "When I get home, I can easily relax and 'switch off' work" owing to the lockdown measures. Respondents rated items such as: "People close to me say I sacrifice myself too much for my job."

Colleague-ratings

Energetic outcomes. We measured work engagement at T2 with the nine-item Utrecht Work Engagement Scale (Schaufeli et al., 2006). An example statement is: "My colleague is bursting with energy at work." We assessed relational energy with the five-item Relational Energy Scale (Owens et al., 2016). The scale includes the item: "After an exchange with this person I feel more stamina to do my work." We measured colleague-rated job effort with the Work Intensity Scale (Brown and Leigh, 1996). An example statement is: "My colleague works at full capacity in all of their job duties."

Developmental outcomes. Informal learning behaviors were measured with the three-item Informal Learning Scale (Noe et al., 2013), including the following item: "My colleague uses trial and error strategies to learn and better perform." We used the four-item innovation subscale of the individual performance instrument to appraise creative performance (Miron et al., 2004). Respondents rated items such as: "My colleague is innovative."

Dark side outcomes. We measured idling behavior with the five-item Bored Behavior Scale (Van Hooff and Van Hooft, 2014). An example statement is: "My colleague is busy with activities to kill the time."

Table 5. Longitudinal invariance test of PWD (Study 3, $N = 257$).

	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA	SRMR	MLR	Comparison	$\Delta\chi^2$	Δdf
Model 1. Configural invariance	424.12	234	1.81	.920	.906	.054	.062	1.0822			
Model 2. Metric invariance	433.20	244	1.77	.921	.910	.053	.065	1.0808	1 vs. 2	8.80	10
Model 3. Scalar invariance[a]	464.73	256	1.82	.912	.906	.054	.068	1.0768	2 vs. 3	32.36**	12

*$p < .05$; **$p < .01$. MLR = Scaling Correction Factor for MLR. $\Delta\chi^2$ = Sattora-Bentler Scaled Chi-Square Difference. [a]scalar invariance is not rejected based on the recommendations for testing measurement invariance (Chen, 2007).

Results

Longitudinal psychometric properties

We examined the longitudinal measurement invariance of the PWD instrument across the two measurement occasions by comparing several consecutive models that gradually increase model constraints (Table 5; Vandenberg and Lance, 2000). First, we tested the equivalence of the factor structures and freely estimated all parameters across measurement occasions, which evidenced configural invariance for the PWD scales (Model 1). Next, we constrained the factor loadings to be equal across measurement occasions (Model 2). Indicative of metric invariance, Model 1 and Model 2 did not significantly differ ($p = .551$). Finally, we compared Model 2 with a measurement model that constrained indicator intercepts to be equal across time (Model 3). Model 3 did significantly differ from Model 2 ($p < .01$). However, it is important to note that the decrease in CFI (.009), TLI (.004), RMSEA (.001), and SRMR (.003) between Model 3 and Model 2 was negligible. The chi-square test may erroneously reject a model based on trivial differences owing to its sensitivity. Chen (2007) argued that differences in CFI $< .010$, supplemented by changes in RMSEA $< .015$ or SRMR $< .030$ indicate invariance for samples larger than 300, whereas for samples smaller than 300, differences in CFI $< .005$ supplemented by a change in RMSEA $< .010$ or in SRMR $< .005$ indicate invariance. The results based on our sample meet the criteria regarding the RMSEA and SRMR fit measures, but the CFI slightly deviates from the recommended cut-off score. However, in light of the other fit measures and given that our sample size is close to 300, we argue that this slight deviation does not warrant concern. The reliability coefficients for designing fun ($\alpha_{T1} = .80$, $\omega_{T1} = .81$; $\alpha_{T2} = .83$, $\omega_{T2} = .83$) and designing competition ($\alpha_{T1} = .69$, $\omega_{T1} = .68$; $\alpha_{T2} = .72$, $\omega_{T2} = .71$) were acceptable at Time 1 and Time 2. Finally, the test–retest reliability of the designing fun ($r_{ij} = .78$) and designing competition ($r_{ij} = .69$) scales was acceptable. Taken together, the results indicate that the scales represent a psychometrically sound and reliable instrument.

Predictive validity

Table 6 lists the descriptive statistics of the variables. We expected that drive (Hypothesis 17a), reward responsiveness (Hypothesis 17b), and fun seeking (Hypothesis 17c) are positively associated with designing fun, whereas BIS will diverge from designing fun. As predicted, designing fun correlated positively with reward responsiveness ($r = .23$, $p < .01$) and fun seeking ($r = .31$, $p < .01$). However, designing fun did not correlate with drive ($r = .10$, $p = .114$) and BIS ($r = –.09$, $p = .131$). Hence, Hypothesis 17 is partially supported. Hypothesis 18 states that (a) drive, (b) reward responsiveness, and (c) fun seeking correlate positively with designing competition, whereas BIS is expected to diverge from designing fun. Indeed, drive ($r = .35$, $p < .01$), reward responsiveness ($r = .36$, $p < .01$), and fun seeking ($r = .25$, $p < .01$) were positively associated with designing competition, whereas BIS did not correlate with designing competition ($r = –.01$, $p = .913$). Taken together, the findings indicate that PWD converges with the BAS, but diverges from the BIS.

Hypothesis 19 proposes that designing fun would relate positively to (a) self-ratings of work engagement as well as to colleague-ratings of (b) work engagement, (c) relational energy, and (d) job effort. In partial support of our hypothesis, designing fun positively related to self-ratings of work engagement ($r = .30$, $p < .01$) and colleague-ratings of work engagement ($r = .28$, $p < .01$), but did not relate to colleague-ratings of relational energy ($r = .11$, $p = .088$) and job effort ($r = .08$, $p = .222$). Hypothesis 20 states that designing competition is positively associated with (a) self-ratings of work engagement as well as colleague-ratings of (b) work engagement, (c) relational energy, and (d) job effort. Designing competition correlated positively with self-ratings of work engagement ($r = .46$, $p < .01$) as well as with ratings by colleagues of work engagement ($r = .31$, $p < .01$) and job effort ($r = .24$, $p < .01$), but did not promote relational energy ($r = .04$, $p = .581$).

We further hypothesized that designing fun would correlate positively with colleague-ratings of informal learning (Hypothesis 21a) and creative performance (Hypothesis 21b). Indeed, designing fun was positively associated with informal learning ($r = .18$, $p < .01$) and creative performance ($r = .28$, $p < .01$). Likewise, we hypothesized that designing competition would relate positively to informal learning (Hypothesis 22a) and creative performance (Hypothesis 22b). Designing competition was positively related to informal learning ($r = .21$, $p < .01$) and creative performance ($r = .17$, $p < .05$).

Hypothesis 23 proposes that designing fun positively relates to (a) psychological overcommitment, (b) behavioral overcommitment, and (c) colleague-ratings of idling behavior. Likewise, we hypothesized that designing competition would be positively associated with (Hypothesis 24a) psychological overcommitment, (Hypothesis 24b) behavioral overcommitment, and (Hypothesis 24c) colleague-ratings of idling behavior. Contrary to our expectations, designing fun did not relate to psychological overcommitment ($r = –.02$, $p = .774$), behavioral overcommitment ($r = .06$, $p = .336$), and idling behavior ($r = –.01$, $p = .937$). Similarly, designing competition was not associated with psychological overcommitment ($r = .09$, $p = .169$), behavioral overcommitment ($r = .06$, $p = .336$), and idling behavior ($r = –.01$, $p = .878$).

Table 6. Means, standard deviations, reliabilities (between brackets), and correlations between the variables (Study 3, $N = 276$ at Time, $N = 257$ at Time 2).

	M	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. Designing fun$_{T1}$	3.57	.62	(.80)																			
2. Designing competition$_{T1}$	3.43	.59	.43**	(.69)																		
3. Designing fun$_{T2}$	3.51	.60	.78**	.40**	(.83)																	
4. Designing competition$_{T2}$	3.36	.58	.32**	.69**	.44**	(.72)																
5. Fun activities$_{T1}$	2.49	.69	.07	.14*	.06	.12*	(.77)															
6. Personal initiative$_{T1}$	3.96	.49	.35**	.51**	.37**	.41**	.03	(.81)														
7. Job crafting$_{T1}$	3.55	.44	.28**	.50**	.31**	.48**	.21**	.63**	(.85)													
8. Drive$_{T2}$	4.79	.94	.10	.35**	.16**	.34**	.07	.45**	.34**	(.72)												
9. Reward responsiveness$_{T2}$	5.85	.53	.23**	.36**	.23**	.38**	.09	.33**	.26**	.47**	(.61)											
10. Fun seeking$_{T2}$	4.50	.83	.31**	.25**	.36**	.26**	.05	.32**	.23**	.44**	.40**	(.57)										
11. Behavioral inhibition$_{T2}$	4.87	1.00	−.09	−.01	−.14*	−.03	−.11	−.11	−.01	.02	.10	−.10	(.85)									
12. Work engagement$_{T2}$	3.80	.56	.30**	.46**	.30**	.46**	.04	.33**	.19**	.12	.26**	.12	−.13*	(.89)								
13. CR work engagement$_{T2}$	3.93	.48	.28**	.31**	.23**	.23**	.07	.24**	.20**	.19**	.11	.11	−.09	.43**	(.87)							
14. CR relational energy$_{T2}$	3.98	.64	.11	.04	.07	−.03	.03	.05	.04	.04	−.01	.03	−.07	.12	.48**	(.90)						
15. CR job effort$_{T2}$	4.21	.52	.08	.24**	.12	.24**	.02	.27**	.21**	.23**	.12	.09	−.01	.16*	.57**	.48**	(.87)					
16. CR informal learning$_{T2}$	4.02	.65	.18**	.21**	.17*	.16*	.05	.22**	.25**	.11	.02	.17*	.06	.14*	.46**	.41**	.57**	(.83)				
17. CR creative performance$_{T2}$	3.88	.69	.28**	.17*	.24**	.02	.03	.30**	.20**	.17*	.07	.22**	−.05	.12	.40**	.44**	.42**	.54**	(.88)			
18. Psychological overcommitment$_{T2}$	2.85	.74	−.02	.09	−.06	.03	−.13*	.17**	.07	.12	.02	.04	.37**	−.08	.11	.12	.12	.15*	.05	(.79)		
19. Behavioral overcommitment$_{T1}$	4.04	7.55	−.06	−.06	−.04	.06	−.04	.03	−.01	.01	−.03	−.00	−.00	−.01	.07	.02	.05	.07	−.05	.21**		
20. CR idling behavior$_{T2}$	2.03	.58	−.01	−.01	.09	.03	.12	−.04	.03	−.02	.04	−.01	−.01	−.06	−.28**	−.23**	−.34**	−.20**	−.13	−.08	−.04	(.70)

*$p < .05$; **$p < .01$. CR = colleague-rated.

Incremental predictive validity

We assessed the incremental predictive validity of both PWD dimensions while controlling for the other PWD dimension as well as by accounting for fun activities, personal initiative, and job crafting. PWD, fun activities, personal initiative, and job crafting were measured at Time 1, whereas the outcome variables were measured at Time 2 (Table 7; behavioral overcommitment was measured at Time 1). First, most associations were robust when controlling for the opposing PWD dimension. The incremental validity of PWD beyond fun activities was substantial as none of the associations changed when we included fun activities. Similarly, designing fun and designing competition explained additional variance beyond personal initiative and job crafting in self-rated work engagement as well as colleague-ratings of work engagement, job effort, and creative performance. Moreover, replicating the findings, the pattern of significance at Time 2 mostly replicated the correlation matrix at Time 1 (91.11% of the correlations). However, the associations of (a) designing fun with reward responsiveness and informal learning, and (b) designing competition with creative performance became non-significant. When we controlled for personal initiative, the associations of designing competition with drive and fun seeking became non-significant. In addition, when we accounted for personal initiative and job crafting, two consistent changes emerged. First, designing competition was no longer related to creative performance. Second, the associations between PWD and informal learning were no longer significant.

We conducted dominance analyses to further assess the incremental predictive validity of the PWD scales. Dominance analysis is warranted when predictors are intercorrelated, since determining relative importance based on regression analyses may lead to faulty conclusions (Azen and Budescu, 2003). This analysis determines the relative importance of predictors in terms of complete, conditional, and general dominance (Luo and Azen, 2013). Complete dominance is established when a predictor always shows higher incremental validity than another predictor across all possible submodels of predictors. When the average incremental variance within each submodel is greater than that of another predictor, this signifies conditional dominance. Finally, general dominance implies that the average conditional contribution is greater than that of the other predictor. We performed dominance analyses for the outcome variables that significantly related to the competing predictors in addition to PWD (i.e. proactive behaviors and fun activities). While Table 8 presents the metrics for all three forms of dominance, we mainly limit our discussion to the general dominance of the focal variables.

For self-rated work engagement, the most important predictor was designing competition (56.4%) followed by personal initiative (20.7%), designing fun (16.6%), job crafting (5.81%), and fun activities (0.41%). The PWD dimensions also dominated the other predictors in explaining additional variance in colleague-rated work engagement. That is, designing competition (38.5%) and designing fun (32.3%) contributed more additional variance on average than personal initiative (16.9%), job crafting (9.2%), and fun activities (3.08%). The most important predictor of colleague-rated effort was personal initiative (44.8%) followed by designing competition (33.3%), job crafting (18.4%), designing fun (3.4%), and fun activities (0.0%). In terms of colleague-rated learning, job crafting (37.0%) explained more additional variance on average than personal initiative

Table 7. Incremental predictive validity of the PWD instrument (Study 3, $N = 276$ at Time, $N = 257$ at Time 2).

Control variables	PWD[1]				Fun activities				Personal initiative				Job crafting			
	DF_{T1}	DC_{T1}	DF_{T2}	DC_{T2}	DF_{T1}	DC_{T1}	DF_{T2}	DC_{T2}	DF_{T1}	DC_{T1}	DF_{T2}	DC_{T2}	DF_{T1}	DC_{T1}	DF_{T2}	DC_{T2}
Drive	−.07	.32**	.01	.29**	.09	.32**	.15*	.32**	−.08	.11	−.01	.17*	.02	.21**	.07	.21**
Reward responsiveness	.10	.29**	.11	.31**	.25**	.36**	.26**	.38**	.15*	.24**	.17*	.29**	.20**	.29**	.20**	.31**
Fun seeking	.23**	.15*	.26**	.17*	.32**	.27**	.36**	.30**	.23**	.10	.27**	.19**	.27**	.16*	.30**	.21**
Behavioral inhibition	−.08	.00	−.13	.01	−.09	−.03	−.13	−.04	−.05	.03	−.10	.00	−.09	−.03	−.13	−.04
Work engagement	.14*	.39**	.17*	.36**	.32**	.47**	.34**	.46**	.24**	.38**	.26**	.38**	.29**	.44**	.30**	.42**
CR work engagement	.18**	.21**	.15*	.14*	.29**	.31**	.23**	.22**	.23**	.22**	.16*	.14*	.26**	.24**	.18**	.15*
CR relational energy	.11	−.01	.09	−.07	.12	.04	.07	−.04	.10	.01	.05	−.06	.11	.02	.06	−.06
CR job effort	−.02	.25**	.01	.21**	.11	.27**	.12	.24**	.01	.14*	.02	.14*	.05	.16*	.04	.14*
CR informal learning	.09	.16*	.11	.10	.18**	.21**	.16*	.16*	.11	.11	.09	.08	.12	.11	.09	.05
CR creative performance	.23**	.06	.25**	−.10	.28**	.18**	.23**	.02	.20**	.02	.14*	−.12	.25**	.09	.19**	−.08
Psychological overcommitment	−.06	.12	−.08	.08	−.01	.12	−.04	.07	−.08	.00	−.12	−.03	−.03	.06	−.08	.01
Behavioral overcommitment	−.05	−.02	−.07	.08	−.07	−.05	−.03	.06	−.09	−.09	−.05	.05	−.07	−.06	−.04	.06
CR idling behavior	.00	.02	.08	.00	.01	.01	.08	.02	.02	.05	.10	.05	.00	−.01	.07	.01

*$p < .05$; **$p < .01$. DF = designing fun; DC = designing competition; CR = colleague-rated. [1]Controlling for the other PWD dimension.

Table 8. Results of the dominance analyses (Study 3, $N = 276$ at Time, $N = 257$ at Time 2).

	Self-rated work engagement$_{T2}$		Colleague-rated work engagement$_{T2}$		Colleague-rated effort$_{T2}$		Colleague-rated informal learning$_{T2}$		Colleague-rated creative performance$_{T2}$	
	R^2	% R^2 rank	R^2	% R^2 rank	R^2	% R^2 rank	R^2	% R^2 rank	R^2	% R^2 rank
Designing fun$_{T1}$	0.040	16.6%	0.042	32.3%	0.003	3.4%	0.014	17.3%	0.052	40.0%
Designing competition$_{T1}$	0.136	56.4%	0.050	38.5%	0.029	33.3%	0.016	19.8%	0.009	6.9%
Fun activities$_{T1}$	0.001	0.41%	0.004	3.08%	0.000	0.0%	0.002	2.5%	0.001	0.8%
Personal initiative$_{T1}$	0.050	20.7%	0.022	16.9%	0.039	44.8%	0.019	23.5%	0.054	41.5%
Job crafting$_{T1}$	0.014	5.81%	0.012	9.2%	0.016	18.4%	0.030	37.0%	0.014	10.8%
Total	0.241	100.0%	0.130	100.0%	0.087	100.0%	0.081	100.0%	0.130	100.0%

Dominance metrics	Comp	Cond	Gen	Comp	Cond	Gen	Comp	Cond	Gen	Comp	Cond	Gen	Comp	Cond	Gen
DF > DC	0	0	0	.5	.5	0	0	0	0	.5	.5	0	1.0	1.0	1
DF > FA	1.0	1.0	1	1.0	1.0	1	.5	1.0	1	1.0	1.0	1	1.0	1.0	1
DF > PI	.5	0	0	1.0	1.0	1	0	0	0	.5	.5	0	.5	.5	0
DF > JC	.5	.5	1	1.0	1.0	1	.5	.5	0	0	0	0	1.0	1.0	1
DC > FA	1.0	1.0	1	1.0	1.0	1	1.0	1.0	1	1.0	1.0	1	.5	1.0	1
DC > PI	1.0	1.0	1	1.0	1.0	1	0	0	0	.5	0	0	0	0	0
DC > JC	1.0	1.0	1	1.0	1.0	1	1.0	1.0	1	0	0	0	.5	.5	0
FA > PI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FA > JC	0	0	0	.5	.5	0	0	0	0	0	0	0	.5	.5	0
PI > JC	1	1	1	1.0	1.0	1	1.0	1.0	1	0	0	0	1.0	1.0	1

DF = designing fun; DC = designing competition; FA = fun activities; PI = personal initiative; JC = job crafting; Comp = complete dominance; Cond = conditional dominance; Gen = general dominance; 1 = X_i dominates X_j; .5 = dominance cannot be established between X_i and X_j; 0 = X_j dominates X_i.

(23.5%), designing competition (19.8%), designing fun (17.3%), and fun activities (2.5%). Finally, personal initiative (41.5%) was closely followed by designing fun (40.0%) in explaining additional variance in colleague-rated creative performance; job crafting (10.8%), designing competition (6.9%), and fun activities (.8%) explained less additional variance on average. Taken together, PWD shows strong incremental validity in terms of work engagement, whereas designing fun and designing competition especially explain additional variance in outcomes that match their ludic content (i.e. creative performance) and agonistic nature (i.e. effort), respectively. While job crafting was the most important predictor of informal learning, the average incremental predictive power of PWD in relation to informal learning was greater than fun activities but not greater than personal initiative.

Discussion

Study 3 further evidenced the psychometric robustness and validity of the PWD instrument. The findings indicate that the PWD scales represent a reliable and invariant assessment tool across measurement occasions. In addition, the findings further substantiate the positioning of PWD as a proactive strategy to attain "gains" (promotion-motivational) but as divergent from behavior that avoids "losses" (prevention-motivational; Higgins, 2014). The analyses established the predictive and incremental explanatory power of the PWD instrument. Employees who playfully designed work were rated as more engaged, learning informally, and creative by their colleagues. However, only employees who designed competition were perceived as exerting more job effort, whereas designing fun did not relate to job effort. Possibly, this absent association is qualified by the occupational industry. For instance, the use of humor may only be perceived as job effort in the sales, hospitality, tourism, and retail industries (Cheng et al., 2021; Gilliam et al., 2014; Tsaur et al., 2019). Finally, endorsing the distinctiveness and robustness of PWD, most associations at Time 1 replicated at Time 2 and remained significant when controlling for the opposing PWD dimension, fun activities, personal initiative, or job crafting. Moreover, dominance analyses revealed that designing fun and designing competition were relatively important predictors for self-rated work engagement, colleague-rated work engagement, effort, and creative performance. Unexpectedly, PWD was not associated with relational energy and the "dark side" criteria. First, the timing of the data collection might explain the absent association between PWD and relational energy. The majority of the sample faced strict lockdown measures and therefore worked remotely. Conceivably, the lack of face-to-face interactions owing to the COVID-19 lockdown limited the energizing potential of PWD behaviors (Howell and Hall-Merenda, 1999). While the null findings regarding PWD and overcommitment and idling behaviors are encouraging, other factors may moderate these associations. For instance, PWD might only promote overcommitment for individuals with workaholic tendencies. Likewise, the values and beliefs of colleagues such as endorsing a Protestant work ethic might determine whether colleagues consider PWD behaviors as subversive (Petelczyc et al., 2018; Sanchez-Burks, 2002; Tang and Baumeister, 1984).

General discussion

The purpose of this study was to conceptualize play as an individual work design strategy – PWD – as well as to develop and validate a measurement tool. We conducted a series of studies that demonstrated the psychometric properties and validity of the PWD instrument. Taken together, the present study makes three core contributions. First, we integrated the play and work design literatures to conceptualize PWD. The integration expands research on play and individual work design by explicating the two-dimensional and self-started nature of play in organizations. Second, we developed a psychometric sound and valid instrument, which revealed that PWD is distinguishable from other proactive behaviors as well as incrementally explaining variance beyond related concepts. The instrument enables systematic research to test and refine theories regarding play during work. The findings demonstrate that PWD is a unique and worthwhile concept. Finally, we validate current theorizing regarding the interrelations between play in organizations, individual differences, well-being, and performance behaviors.

Theoretical contributions

First, the topic of play during work has received relatively little attention in the organizational sciences (Mainemelis and Ronson, 2006). We expand the literatures on play and work design by conceptualizing PWD as an individual work design strategy that utilizes play as a mechanism for change. Specifically, based on our literature review, we defined PWD as the proactive cognitive-behavioral orientation to work activities to foster fun and challenge. Furthermore, the two-dimensional conceptualization adheres to the duality of play (Kolb and Kolb, 2010) and answers calls for the differentiation between types of play (Petelczyc et al., 2018). We argued employees may playfully design work activities in a ludic fashion (designing fun) and agonistic fashion (designing competition). The conceptualization delineates how PWD differs from other play initiatives and proactive behaviors in terms of the agent (employee vs. organization), mechanism for change (play vs. role contraction and expansion), orientation in time (short-term vs. long-term), and intended target of impact (self vs. organization).

Second, we developed and validated a psychometrically sound instrument, which answers calls for scales that measure play (e.g. Petelczyc et al., 2018; Van Vleet and Feeney, 2015). Across three studies, the findings indicate that the instrument provides a reliable and invariant method for assessing PWD. In addition, the results validate the two-dimensional measurement of PWD as a unique synthesis of (ludic and agonistic) play and proactivity. The dimensions of PWD correlated similarly with general playful traits, proactive behaviors, and situational conditions. However, ludic traits especially correlated with designing fun and agonistic traits particularly related to designing competition. The distinctiveness of PWD and its measurement was further substantiated by confirmatory factor analyses and incremental validity evidence. The findings revealed that designing fun and designing competition are discernable from job crafting behaviors and explain incremental variance in a variety of constructs beyond each other and related concepts. Taken together, the findings emphasize the usefulness of the PWD instrument for research on the antecedents, consequences, and boundary conditions of play during work.

Third, contemporary research on play has proposed that play is instrumental for employees as well as organizations. We extend current theorizing regarding play by empirically demonstrating that PWD may represent a valuable strategy for optimizing well-being as well as performance behaviors (Celestine and Yeo, 2021; Mainemelis and Ronson, 2006). The present study provides more insight into how and why play during work activities may contribute to employees' energies and facilitate performance behaviors. Indeed, we found that employees who designed fun and designed competition during work were more engaged with work. These findings were validated by colleague-ratings of work engagement as well as observations of job effort and creative performance. Moreover, the results revealed that designing fun and designing competition appear to explain more additional variance on average than job crafting or personal initiative in outcomes such as work engagement, effort, and creative performance. For instance, designing fun and designing competition generally dominated fun activities, personal initiative, and job crafting in explaining variance in colleague-rated work engagement. In contrast, we did not find evidence for the dark side of PWD. That is, the findings appear to indicate that PWD does not represent overcommitting or subversive behavior. These findings extend and expand previous research that utilized self-ratings and intraindividual methodologies (Scharp et al., 2019, 2021). That is, these studies revealed that on days when individuals play during work, they have a *relatively* "good" day in terms of work engagement and performance in comparison to their other workdays (within-person); however, the present findings reveal that individuals who play are generally rated as more energetic and better performing than their less playful counterparts (between-person). In other words, the use of PWD appears to not only relate to relative intraindividual advantages – also interindividual differences are apparent. Moreover, the findings reveal that the association between PWD and various performance behaviors is readily observed across various occupations (Bakker et al., 2020a). Taken together, the findings suggest that PWD is worthwhile for employees and organizations.

Limitations and future research

While the present findings are promising, several limitations require future consideration. First, the longitudinal invariance and temporal ordering of the constructs warrant further scrutiny for two reasons. Namely, PWD was measured on two occasions, which may have influenced our findings. Future research may bolster claims regarding longitudinal invariance by increasing the number of measurement occasions. Additionally, we did not correct for stability paths, which implies we can only make claims regarding temporal precedence but not causality. For this purpose, future research may employ a cross-lagged panel or experimental research designs. Second, the associations between PWD, boredom, and exhaustion were unclear and require further investigation. Possibly, by taking an inter- and intraindividual approach, future research may distinguish how the interrelations differ across levels of analysis. Future research may further disentangle these associations by utilizing a (quasi) affect experimental design such as daily nudging (e.g. Weintraub et al., 2021) or a dynamic observational approach such as episodic experience sampling (Csikszentmihalyi and Larson, 1987). Third, although the findings showed that the scales for assessing PWD were largely invariant, future studies may

further test the measurement invariance of the PWD instrument using different organizational and national contexts. Finally, in consideration of Study 1, the observation that PWD correlates more strongly with personality warrants future research. Possibly, owing to the short-term focus, PWD depends less on *general* job characteristics and more on dispositional tendencies and *daily* job characteristics. Future research may investigate to what extent these findings generalize across levels by utilizing daily diary methodology. Additionally, future research may utilize the PWD instrument to further investigate play during work (see Bakker et al., 2020b) to explain (1) *why* PWD especially fosters work engagement under certain circumstances and for certain individuals (Scharp et al., 2019, 2021) as well as (2) when and why PWD manifests.

Practical implications

The findings suggest that promoting PWD represents a valuable strategy for employees and organizations. PWD may represent a cost-effective tool to foster well-being as well as performance behaviors. Employees may strive to infuse work with play to optimize their well-being and performance. For organizations, the PWD instrument may also act as a developmental tool in several ways (Bakker et al., 2020b). First, the measurement tool offers insight to organizations regarding the prevalence of PWD and whether the situation warrants an intervention. Second, during interventions, participants may utilize the instrument to examine and reflect on their PWD levels. Furthermore, based on the scores, certain participants may share important insights in how they playfully design specific work activities. Sharing personal PWD experiences may foster and inspire PWD behaviors in other participants. Finally, the instrument can be used to evaluate the efficacy of PWD interventions by comparing a pre- and post-measurement. It should be noted that, since intrinsic motivation constitutes a core quality of play, interventions necessitate voluntary participation because mandated attendance will likely diminish their benefits (Fleming, 2005).

Conclusion

Research on individual work design strategies has flourished in recent years (Parker, 2014; Parker et al., 2006). However, we know little about how employees use play to proactively organize their work activities. The present study expands the literatures on play and work design by conceptualizing PWD and validating its measurement. PWD represents a two-dimensional proactive cognitive-behavioral orientation that constitutes cognitively and behaviorally restructuring work activities in a ludic (designing fun) and agonistic fashion (designing competition). To conclude, play permeates our lives, and the domain of work is no exception. Hence, many opportunities exist for future research on play during work activities. This fruitful avenue for research may benefit from a reliable and valid scale such as the PWD instrument.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Yuri S Scharp https://orcid.org/0000-0001-8154-7443

Arnold B Bakker https://orcid.org/0000-0003-1489-1847

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Yuri S Scharp is a post-doctoral researcher at Erasmus University Rotterdam in the Netherlands. His research interests include playful work design, gamification, and technology as well as their relation with employee well-being and performance. Find more at www.yurischarp.com. [Email: scharp@essb.eur.nl]

Arnold B Bakker is Professor of Work and Organizational Psychology at Erasmus University Rotterdam, and visiting professor at the University of Johannesburg, North-West University, the University of Zagreb, and the University of Bergen in Norway. His research interests include work engagement, Job Demands–Resources theory, job crafting, playful work design, and the Work-Home Resources model. He is included in Thomson-Reuters' list of most influential scientists since 2013. Find more at www.arnoldbakker.com. [Email: bakker@essb.eur.nl]

Kimberley Breevaart is an Associate Professor of Organizational Psychology at the Erasmus University Rotterdam in the Netherlands. Her main research topic is leadership; she studies abusive supervision, day-to-day leadership, and the relations between personality, leadership, and employee well-being. She is currently section editor at *Stress & Health*. [Email: breevaart@essb.eur.nl]

Kaspar Kruup is junior lecturer of Communication Sciences at the University of Tartu in Estonia. His fields of interests are rhetoric, leadership, strategic thinking, systems theory, and technology theory. [Email: kaspar.kruup@ut.ee]

Andero Uusberg is a senior researcher at the University of Tartu in Estonia. He studies how affective states regulate the way people behave and how people in turn regulate their own and others' affective states. He holds a PhD from the University of Tartu and has worked as a postdoctoral researcher at Stanford University. [Email: andero.uusberg@ut.ee]