



# Flow and Flourishing During the Pandemic: The Roles of Strengths Use and Playful Design

Wei Liu<sup>1</sup> · Wen Zhang<sup>2</sup> · Dimitri van der Linden<sup>3</sup> · Arnold B. Bakker<sup>3,4</sup>

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## Abstract

Ruminative thoughts induced by the COVID-19 pandemic have an adverse impact on individual well-being. However, little is known about how to alleviate such a negative effect – let alone how a person can flourish during crises. The current study uses the self-determination model of flow to propose that two proactive behaviors, strength use and playful design, are positively related to the flow experience, which, in turn, is positively related to daily flourishing. Moreover, we propose that the effects of proactive behaviors on flow are stronger when individuals ruminate more about COVID-19 pandemic. Using a day reconstruction method, we collected data from university students across five consecutive days ( $N$ -person = 135,  $N$ -day = 665,  $N$ -activity = 2985). Multilevel results showed that strengths use and playful design were positively related to flow experience. In turn, flow experience was positively related to daily flourishing. Moreover, we found that COVID-19 rumination moderated the associations between proactive behaviors and flow, such that strengths use and playful design were more effective to foster flow when individuals had a higher (vs. lower) level of rumination. The results imply that in order to function well and flourish during a crisis, individuals could make use of their strengths or playfully design the activities in their daily lives. In a broader sense, we provide concrete behavioral strategies to cope with the downsides of negative events.

**Keywords** COVID-19 rumination · Strengths use · Playful design · Flow · Flourishing

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✉ Wen Zhang  
janewen19@gmail.com

<sup>1</sup> Faculty of Industrial Design Engineering, Technical University Delft, Delft, Netherlands

<sup>2</sup> Department of Psychology, Beijing Normal University, 19 Xinjiekou Wai Street, Haidian District, Beijing 100875, China

<sup>3</sup> Center of Excellence for Positive Organizational Psychology, Erasmus University Rotterdam, Rotterdam, Netherlands

<sup>4</sup> Department of Industrial Psychology and People Management, University of Johannesburg, Johannesburg, South Africa

## 1 Introduction

The COVID-19 pandemic has dramatically changed millions of lives around the world. Since the outbreak of this pandemic, resultant mortalities, infections and restrictive measures have headlined the news and trended on social media – having a significant negative impact on individual well-being and functioning (Yi-Feng Chen et al., 2021). When people immerse themselves in such a virtual environment, they may experience higher levels of anxiety (Trougakos et al., 2020), depression (Ye et al., 2020) and rumination (Bakker & Van Wingerden, 2021). Rumination refers to consistent and repetitive negative thoughts regarding adverse events and non-ideal personal states (Treynor et al., 2003). Since rumination about the COVID-19 pandemic may be related to a variety of negative outcomes, such as impaired cognitive functioning and decreased well-being (Bakker & Van Wingerden, 2021), it is timely and important to understand *how* individuals cope with the pandemic and possible future crises to protect their well-being.

The current study proposes that proactive behaviours in the context of the COVID-19 pandemic may have helped to mitigate the negative effects of rumination. Using self-determination theory (Bakker & Van Woerkom, 2017; Ryan & Deci, 2000), we focus on two sets of proactive behaviours: (1) strengths use, which refers to doing the things one is relatively good at (Bakker & Van Woerkom, 2018); and (2) playful design, which refers to the behavioural orientation to redesign tasks/activities to be more fun and more challenging (Schäp et al., 2019; Verwijmeren et al., 2023). We propose that these two proactive behavioural strategies may foster daily flourishing, which refers to a psychological state in which one feels fulfilled and self-actualised (Diener et al., 2010), through the experience of flow. Flow is a state of mind associated with a loss of self-awareness, high intrinsic motivation and a deep sense of absorption (Bakker, 2008; Csikszentmihalyi, 2020). In addition, we argue that strengths use and playful design are more effective when individuals have high (vs. low) levels of rumination during the COVID-19 pandemic. We propose that when individuals have a high level of rumination, proactive behaviours will be more important and their positive effects on flow will be stronger.

Although several studies have already explored the potential associations between proactivity and COVID-19-related outcomes, most of the research in this area has investigated proactivity as a general or between-person construct, such as personality (Yi-Feng Chen et al., 2021) or other individual differences (Bakker & Van Wingerden, 2021), or used a within-person level approach but focused on daily or weekly strategies (Bakker et al., 2021). Few studies have examined how individuals deal with the pandemic on a micro-level, providing insight into what individuals can do from moment to moment to deal with the crisis. In other words, the specific behavioural strategies individuals can use at an *activity level* to deal with the downsides of COVID-19 have been understudied. It is crucial to understand the concrete activities or behaviours that individuals have enacted during the COVID-19 pandemic, rather than only focusing on general strategies and experiences (i.e., between-person level, weekly level), as information about concrete activities has the potential to provide more pragmatic suggestions.

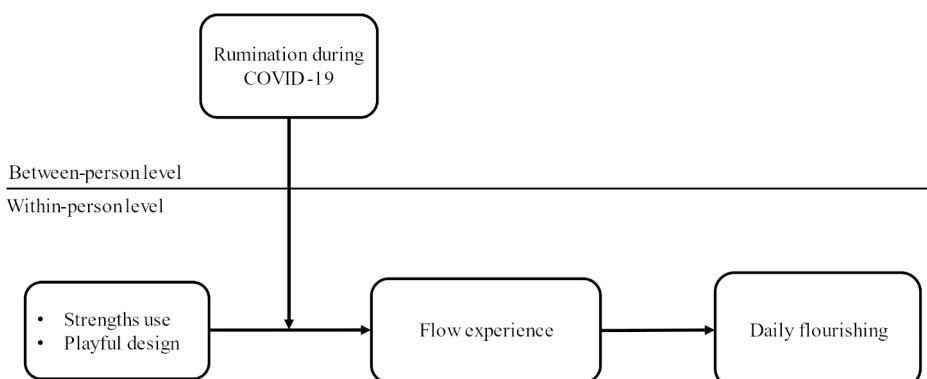
We used a day reconstruction method (DRM; Kahneman et al., 2004; Oerlemans & Bakker, 2018) focused on activity and daily levels of proactive behaviours and experiences. This method enabled us to collect data at three levels (person-level, day-level, and activity-level), which provided more subtle and dynamic evidence on COVID-19-related proactive

strategies than previous studies. Specifically, we expand the previous literature by shedding light on concrete activities during which individuals may use proactive strategies to foster flow and flourishing. The DRM approach, which is focused on an activity level, can reflect and act in sync with the nature of flow, as flow is a relatively transient and volatile state (Bakker, 2008). The present study sheds light on a dynamic and micro-level relationship between proactivity and flow, enabling people to better understand what they can do to alleviate negative effects and continue flourishing on an activity-level basis in a crisis context such as COVID-19.

## 2 Theoretical Background

The COVID-19 pandemic has influenced people around the world for almost three years. Given fewer opportunities to meet families, friends and colleagues, it is conceivable that people may experience more ruminative thoughts during such a period (Bakker & Van Wingerden, 2021). Rumination implies that people may blame themselves when negative events happen and they may not be able to avoid dwelling on negative thoughts (Treynor et al., 2003). In this sense, people may acquire fewer resources to experience flow when they ruminate. Rumination has various definitions, including general (e.g., a mode of responding to distress) and specific rumination (e.g., anger or depressive rumination). In the current study, we adopt the definition that conceptualizes rumination as repetitive and passive thoughts about the symptoms, causes, and future repercussions of one's depression (Nolen-Hoeksema et al., 2008). Within this definition, depressive rumination is characterized by potentially intrusive and negative thoughts.

One adverse consequence of rumination for individual functioning might be a lower likelihood of experiencing flow, considering that flow often requires considerable attentional resources (Liu et al., 2021). One characteristic of flow is a lower self-consciousness. When individuals have more ruminative thoughts, they are less likely to experience flow because rumination induces higher self-consciousness (e.g., self-blame, self-attribution of negative events) (Treynor et al., 2003). Rumination also causes emotional exhaustion as a result of dwelling on negative information (Donahue et al., 2012). Two potential behavioural strate-



**Fig. 1** Proposed model

gies that may enable a person to focus on a current task may be strengths use and playful design.

## 2.1 Strengths Use and Playful Design

Proactive behaviours refer to a set of self-initiated behaviours aimed at creating better environmental conditions (Parker et al., 2019). Proactive behaviours are usually ‘self-starting, future-focused, and involve causing change to oneself or the situation instead of accommodating change or maintaining the status quo’ (Parker et al., 2019, p. 222). Bakker and Van Woerkom (2017) introduced four proactive behaviours/strategies: strengths use, playful work design, job crafting, and self-leadership. They theorised that once one or more of these behaviours are enacted, they allow individuals to satisfy their basic psychological needs for relatedness, competence and autonomy (Ryan & Deci, 2000; Ryan et al., 2008), which in turn likely fosters personal growth and development (Van Woerkom & Meyers, 2019).

Since compared to job crafting and self-leadership, strengths use and playful design can easily be applied in various daily activities (also outside the work domain), such as study and leisure activities (Peterson & Seligman, 2004; Scharp et al., 2019), we chose the latter two behavioural strategies as the focus of the current study. Strengths refer to a set of skills that people are relatively good at. Strengths use allows one to perform well or at one’s best (Govindji & Linley, 2007). Strengths are normally trait-like, stable and recognised as personal characteristics (Peterson & Seligman, 2004). For example, some people are good at solving problems by coming up with different solutions (creativity), whereas others may excel at interacting with people, recognizing emotions, and building new connections (social intelligence). Despite strengths often being relatively stable, the enactment of strengths fluctuates on a daily and momentary basis, depending on personal states and contexts (Bakker et al., 2019).

Playful design refers to the behavioural-cognitive orientation through which people (re)design their study or work tasks to include more *fun* and/or *challenges* without changing the tasks themselves (Bakker et al., 2020). Bakker and colleagues indicated that playful design should also be investigated in the study context because study life is flexible and provides autonomy, which implies ample possibilities to display proactive behaviour. According to Scharp et al. (2019), playful design consists of two distinct clusters of play elements. One is ludic play, which is characterised by humour, excitement and entertainment, referring to creating more fun and pleasure in existing tasks (Barnett, 2007). The other cluster is agonistic play, which is concerned with effort, goals and purpose, serving to pose challenges and help a person grow and achieve a sense of meaningfulness (Caillois, 2001). For example, the use of wit and humour in work settings can be seen as playfully redesigning tasks or activities to be more fun; adding more competence (e.g., finishing tasks in a limited time, beating the clock) to existing tasks refers to playfully redesigning tasks or activities to be more challenging. Because these two types of proactive changes to existing tasks refer to completely different aspects of playful design, we also intend to measure both aspects. Correspondingly, ludic play relates to ‘designing fun’, and agnostic play relates to ‘designing competition’ in the measures.

## 2.2 Flow Experience

Proactive behaviours, such as strengths use and playful design, have the potential to foster flow experience. Csikszentmihalyi (2020) pointed out that two important features of flow are skill-challenge balance and the merging of action and awareness. Bakker (2008) elaborated on the flow state and established three main pillars underlying flow: absorption (a complete focus on the task at hand), enjoyment (a happy mood) and intrinsic motivation (conducting tasks for their own sake). Even though positive affect is not necessarily being felt during flow, as Csikszentmihalyi (1999, p. 825) noted ‘during flow people are not necessarily happy because they are too involved in the task’ – when the experience is over, however, people typically report having been in a positive state.

A potential reason for the positive association between proactive behaviour and flow is the satisfaction of basic psychological needs (Bakker & Van Woerkom, 2017). A proposed model—the self-determination model of flow proposed by Bakker and Van Woerkom (2017)—assumes that individuals can use proactive strategies to satisfy basic psychological needs, which in turn will foster optimal functioning, such as flow. According to self-determination (Ryan & Deci, 2000) and psychological well-being theories (Ryff, 1989), when individuals proactively seek to satisfy basic psychological needs such as the needs for competence, relatedness and autonomy, they harvest the ‘nutrition’ for personal growth, exert more effort in the current moment and achieve a sense of self-fulfilment. In addition, several studies have empirically tested and shown that proactive behaviours help satisfy basic psychological needs, which in turn are positively related to flow or flow-like experiences (Liu et al., 2021, 2022; Scharp et al., 2022).

Specifically, strengths use can increase a person’s sense of authenticity, which in turn may foster flow (Govindji & Linley, 2007). When people act in accordance with their deep values and personal strengths, they may become more intrinsically motivated and achieve higher levels of personal expressiveness (Sheldon & Elliot, 1999). In addition, when people use their strengths, they tend to generate personal resources, such as self-efficacy (Van Woerkom et al., 2016). Personal resources are important antecedents of flow (Salanova et al., 2006). In addition, the use of strengths can better prepare a person to meet challenges and cope with difficulties in the environment, thereby potentially achieving a better balance between skills and task challenges (Liu et al., 2021). In a recent study of 408 doctors and nurses in Wuhan City, Yi-Feng Chen et al. (2021) reported that perceived strengths use contributed to motivational resources. Using a 30-day diary study, Bakker et al. (2019) have also shown that daily strengths use was positively related to daily well-being, such as positive affect and engagement.

The playful design of certain activities may increase the challenge that a person experiences, thereby helping them reach a better balance between their skills and challenges (Scharp et al., 2019). Skill-challenge balance is a crucial antecedent of flow (Fong et al., 2015). In addition, since playful design also involves social elements, such as making a conversation more fun by telling jokes, it may also foster a feeling of relatedness. This will make the ongoing activity more meaningful (Martela et al., 2018). Several studies have shown that playful design can increase engagement (e.g., Bakker et al., 2021; Scharp et al., 2021, 2022), which is a theoretically relevant construct compared to flow.

**Hypothesis 1** Strengths use (1a) and playful design (1b) are positively related to the flow experience.

### 2.3 Daily Flourishing

During the COVID-19 pandemic, it became relatively difficult and challenging for a person to flourish (i.e. develop skills and fulfil one's potential), because the crisis limited everyone's range of mobility and access to social resources (Zhang, 2022). For example, individuals could choose from an abundance of activities before the pandemic, such as visiting friends, going to the cinema to watch movies, attending conferences, etc. However, during the pandemic, individuals had to make the best use of what they could do at home due to intermittent lockdowns.

Flourishing refers to a psychological state in which one feels fulfilled and self-actualised and in which a person achieves optimal functioning (Diener et al., 2010). Flourishing is conceptualised by three components: psychological functioning, positive feelings and social functioning (Du et al., 2018). The measurement of flourishing (Diener et al., 2010) assesses several aspects of daily life, including meaningfulness, purpose in life, positive relationships and feelings of competence. Flourishing is a state worth pursuing because it has been shown to facilitate well-being and performance (Ouweneel et al., 2011). When people satisfy their basic psychological needs, they are likely to flourish (Ryan et al., 2013). Flourishing also helps individuals obtain a deeper sense of meaningfulness and purpose as they are trying to actualise their own potential as well as expectations from others (Aswini & Deb, 2017). Therefore, they also develop better relationships with others (Padilla-Walker et al., 2017). Using a longitudinal design, Ouweneel et al. (2011) showed that flourishing students are more likely to be engaged in their study tasks and have positive affect and personal resources compared to the students who do not report much flourishing.

During the COVID-19 pandemic, various resources (e.g., social resources) were difficult to obtain because people had to stay at home for extended periods of time. Although the range of mobility and variety of activities were limited, individuals still had the autonomy to choose the things that they wanted to do or at least choose the way (*how*) to conduct an activity that they were fond of. For example, they could do activities based on their strengths or interests or redesign their activities to be more fun and interesting. We argue that one pathway that may have the potential to help individuals flourish during the pandemic is through the use of proactive strategies, namely, strengths use and playful design.

On the days when individuals use their strengths or playfully redesign their activities, they are more likely to experience flow compared to the days when they do not. The flow experience, in turn, may positively relate to flourishing (Ribera & Ceja, 2018). During flow, individuals tend to feel more engaged and live the moment intensely (Csikszentmihalyi & Csikszentmihalyi, 1992). Moreover, people can better deal with challenges when they become more persistent and intrinsically motivated. Since strengths use implies that a person acts in accordance with their abilities and deeper self, fully expressing oneself may enable individuals to feel more authentic and confident (Waterman, 1993). Several studies have shown that strengths use and playful design improve individual optimal functioning and positive outcomes (Ghielen et al., 2018; Scharp et al., 2021). When individuals experience flow, they have a greater chance of functioning optimally and achieving their goals

(Weintraub et al., 2021). On days when individuals achieve their goals, they are more likely to flourish compared to the days when they do not (Datu et al., 2020; Kazak et al., 2021). For example, among 487 undergraduate students, Datu et al. (2020) showed that flourishing was positively associated with achievement goal orientations.

**Hypothesis 2** Strengths use (2a) and playful design (2b) are indirectly positively related to daily flourishing through flow experience.

## 2.4 Moderating Role of Rumination

Although vaccinations and medicine have been produced to offset the adverse influence of the virus, to date, individuals still worry about it, as potential risks for individual health maintain. Despite the fact that some personal and environmental factors, such as age (Carstensen et al., 2020) and hypervigilance (Zhang et al., 2022), may moderate the level of rumination associated with COVID-19, research has shown that there is an overall prevalence of mental health decline (e.g., depression and anxiety) during the COVID-19 pandemic (Ettman et al., 2020; Lakhan et al., 2020).

Rumination often occurs when individuals feel lonely because they have few opportunities to communicate their worries and anxiety with others (Treynor et al., 2003), and some people tend to have more ruminative thoughts than others (Nolen-Hoeksema et al., 2008). Despite some positive consequences of rumination (i.e., thinking thoroughly and carefully) (Altamirano et al., 2010), the majority of studies point to negative consequences of rumination, such as decreased concentration and mental health (Hong et al., 2021).

During the COVID-19 pandemic, social media was covered with negative news centring on the pandemic (i.e., death toll, risk of vaccination, restrictions). This may have intensified negative thinking, as people had to evaluate and digest how this enduring situation would influence their study or work lives in the long run. Among 439 college students in China, Hong et al. (2021) found that exposure to social media during the COVID-19 outbreak resulted in psychological stress through ruminative thoughts. Bakker and Van Wingerden (2021) showed that rumination on COVID-19 impaired well-being and resulted in decreased vigour, increased exhaustion, and increased depressive symptoms.

In the context of COVID-19, we argue that proactive behaviours, such as strengths use and playful design, become more salient and significant to individuals' ability to cope with the downsides of the pandemic. Proactive behaviours are likely to be energising and motivating (Parker et al., 2019); when people make their activities more playful, they are likely to be immersed in the activity by focusing on the task at hand. This might allow individuals to reflect on negative happenings less often and generate more social resources (Bakker & Van Wingerden, 2021). For example, using jokes and humour during a meeting may satisfy relatedness needs. In addition, when people increase task challenges (e.g., breaking time records) to their own level, they may achieve a better balance between their skills and task challenges. A skill-challenge balance is a crucial antecedent of flow (Csikszentmihalyi, 2020; Van der Linden et al., 2021), which helps meeting the psychological need of feeling competent. The fulfilment of basic needs will generate more personal resources (Ryan & Deci, 2000).

In general, people tend to ruminate about COVID-19, such as having concerns about their health, daily life, and society (Ye et al., 2020). When people have high (vs. low) levels of rumination about COVID-19, the positive association between (a) activity-based or episodic strengths use and playful design, and (b) the flow experience may become stronger because proactive behaviours produce affective and energetic resources (e.g., positive affect, vigour) (Cangiano et al., 2019). Trougakos et al. (2020) showed that proactive behaviours were associated with lower levels of health anxiety and helped people cope with COVID-19-related depression. Prior studies have shown that strengths use and playful design are positively related to work engagement and buffer the negative effects of hindrance demands on job performance (Bakker et al., 2019; Bakker & Van Wingerden, 2021; Scharp et al., 2021).

**Hypothesis 3** Rumination during the COVID-19 pandemic moderates the effects of strengths use and playful design on flow, such that the association between proactive behaviours and flow is stronger when people have high (vs. low) rumination.

### 3 Methods

#### 3.1 Participants and Procedures

Participants were Erasmus University Rotterdam students who participated in exchange for study credits. We advertised our study on the Erasmus Behavioural Lab (EBL) Research Administration System, which is an online application used to recruit university student participants. Upon the students' informed consent, a baseline questionnaire was sent to assess rumination during COVID-19 and the participants' demographics. Following that, a daily questionnaire was administrated to assess daily activities, proactive behaviours and flourishing during the following week (from Monday to Friday). We did not collect data on weekends because people often conduct relatively different activities during weekends (e.g., leisure) compared to weekdays, and they were likelier to engage in study or work-related activities during weekdays (Ryan et al., 2010; Zhong et al., 2008). Each day, the daily questionnaire was sent out at 18:00, and participants were friendly requested to complete it before 24:00. They were reminded to fill out the questionnaire at 21:00 if they had not yet responded.

We used a day reconstruction method (DRM). We asked participants to recall the main activities that they had been doing that day (three to five were recommended, but the amount was not limited). This is adapted from Kahneman et al.'s (2004) procedure and is in line with Oerlemans and Bakker (2018), which has the advantage of capturing major activities and experiences but imposing less respondent burden on participants. Participants were then asked to rank the reported activities in chronological order. Following Atler et al.'s (2018) classification of university students' activities, we provided 20 different types of activities (i.e., ranging from attending class to reading; see Table 1). Participants chose at least one or several activities from the list. If their activities were not listed, the participants could write one additional activity. One asset of the current study was that we assessed proactive behaviours and experiences during each activity. Specifically, we asked participants to indicate

**Table 1** Categories of Activities

Categories	Strengths use			Playful design			Flow		
	Mean	N	SD	Mean	N	SD	Mean	N	SD
Attending class	5.13	243	1.44	3.27	243	1.39	4.03	244	1.50
Caring for home/car	4.39	36	1.61	4.42	36	1.59	4.69	36	1.30
Caring or helping others	6.03	39	0.96	4.55	39	1.61	6.11	39	0.78
Commuting	4.47	19	1.50	3.53	19	0.95	3.91	19	1.56
Eating	3.78	296	1.46	3.37	299	1.42	4.90	299	1.17
Engaging in a hobby	6.03	96	1.00	5.09	96	1.33	6.17	96	0.67
Exercise	5.78	163	1.11	5.38	163	1.26	5.81	163	0.99
Mobility	4.29	17	1.45	4.91	17	0.85	5.51	17	0.80
Playing virtual games	5.52	44	1.50	5.44	44	1.31	5.77	44	1.02
Preparing and/or cooking food	5.43	129	1.18	4.14	129	1.51	5.25	130	1.16
Reading	5.00	108	1.50	3.44	108	1.35	5.05	108	1.47
Resting/relaxing	4.01	157	1.41	3.44	158	1.26	5.32	158	1.11
Running errands	4.38	60	1.64	3.81	60	1.54	4.64	60	1.18
Sleeping	3.74	141	1.60	3.06	142	1.41	5.38	142	1.27
Spending time with others	5.16	261	1.34	4.43	261	1.24	6.05	263	0.88
Studying or preparing	5.22	484	1.37	3.65	484	1.45	4.20	486	1.33
Taking care of personal activities	5.29	79	1.16	4.45	79	1.27	5.20	79	1.07
Using technology	3.91	181	1.49	3.31	182	1.34	4.64	182	1.13
Watching/listening	3.93	218	1.61	3.57	219	1.38	5.32	219	1.04
Working	5.32	109	1.55	3.99	109	1.66	4.50	109	1.39
Other	4.46	92	1.73	3.72	92	1.57	5.12	92	1.60
Total	4.77	2972	1.59	3.84	2979	1.53	5.01	2985	1.37

Note. "other" category consists of activities such as shopping, walking, exercising, taking exam/study, visiting museum, seeing a doctor, celebration etc., which were written by participants themselves

the extent to which they used their strengths and playful design and the level of flow during each of their reported activities.

Based on the criteria of sample size in multilevel data and suggestions from Kerkhoff and Nussbeck (2019) regarding three-level data (e.g., at least 35 units in level-3), in total, the baseline questionnaire collected 144 responses (individuals). The initial screening revealed one repeated, three invalid (started the questionnaire but did not continue; the average response time was only 48.3s) and one incomplete survey (33% progress), yielding 139 effective responsiveness. Four participants did not complete the daily questionnaires (final  $N_{\text{between}} = 135$ ). The total number of responses from daily questionnaires was 675, but four responses were incomplete and three participants filled out the survey for less than 2 days (6 responses) (final  $N_{\text{day}} = 665$ ). The average age of the participants was 20.195 years (range=17–28;  $SD=0.176$ ). Of the participants, 88.1% were female. All the participants were from the Department of Psychology of Erasmus University, Rotterdam. The average study hours per day were 6.521 ( $SD=0.539$ ).

### 3.2 Measures

#### 3.2.1 Between-Person Level

Rumination during COVID-19 was measured at the between-person level using the well-known Ruminative Response Scale (Treynor et al., 2003). Because individuals may have different levels of rumination based on their personality and socioeconomic status (Treynor et al., 2003), and the current study refers to rumination as a relatively stable cognitive pattern during which individuals tend to feel depressed and repetitively and passively reflect on stressors (Nolen-Hoeksema et al., 2008). We asked participants to ‘indicate whether you almost never, sometimes, often or almost always think or do each one when you feel down, sad or depressed during COVID-19’. This scale consists of 22 items. Examples are ‘think about how alone you feel’ and ‘think about how hard it is to concentrate’. Responses were rated based on a 4-point Likert scale (1=almost never; 4=almost always). Cronbach’s alpha was 0.930, showing good reliability.

#### 3.2.2 Within-Person Level

At the within-person level, all the responses were rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

#### 3.2.3 Day-Level

Flourishing was measured using Diener et al.’s (2010) Flourishing Scale using eight items and by referring to daily levels. Responses were evaluated based on a 7-point Likert scale (1=*strongly disagree*; 7=*strongly agree*). Examples are ‘Today, I led a purposeful and meaningful life’ and ‘Today, I was engaged and interested in my daily activities’. Cronbach’s alpha at the within-person level was 0.864; Cronbach’s alpha at the between-person level was 0.963, showing good reliability.

#### 3.2.4 Activity-Level

Strengths use was measured using one item: ‘I used my strengths (i.e., what you are good at) in this activity’ (Van Woerkom et al., 2016). One item is effective for increasing participation rates and previous research has confirmed the effectiveness of this technique in a DRM study (Oerlemans & Bakker, 2018).

Playful design was measured using two items based on the Playful Work Design Scale developed by Scharp et al. (2019). One item was used to measure designing fun: ‘I playfully approached this activity.’ The other aimed to measure designing competition: ‘When doing the activity, I tried to make it a series of exciting challenges.’ Cronbach’s alpha at the within-subject level was 0.612; Cronbach’s alpha at the between-subject level was 0.763, showing good reliability.

Flow was measured using Bakker’s (2008) Work-Related Flow Scale (WOLF). We used one item to assess each of the components: ‘I was totally immersed in this activity’ (absorption), ‘I did this activity with a lot of enjoyment’ (enjoyment) and ‘I got my motivation from the activity itself, and not from the reward for it’ (intrinsic motivation). Cronbach’s alpha

at the within-subject level was 0.828; Cronbach's alpha at the between-subject level was 0.757, showing good reliability.

### 3.3 Statistical Analyses

As our data showed a three-level structure, with activities nested within days nested within persons, multilevel regression and path analyses were used to analyse the data (Preacher et al., 2010). All the activity-level variables were centred on day mean when conducting moderation analyses; day-level variables were centred on person mean to exclude between-person differences. First, we entered activity-level strengths use and playful design to predict the activity-level flow experience. Second, in a separate model, we used strengths use, playful design and flow experience to predict daily flourishing. The indirect effects between strength use (playful design) and daily flourishing through flow were calculated using the Monte Carlo method. Third, we entered rumination and multiplied strengths use (playful design) by rumination to obtain cross-level interaction terms (see Table 2). Maximum likelihood estimates were used for the multilevel models. All analyses were conducted using MLwiN version 3.05 (Charlton et al., 2020).

## 4 Results

### 4.1 Descriptive Statistics

We calculated the intercorrelations between study variables at the between-person and within-person levels (day-level). Correlational results showed that strengths use and play-

**Table 2** Unstandardized Coefficients of Within-Person Main-Effect and Cross-Level Moderation-Effect Models

	Flow						Daily flourishing			
	Step 1		Step 2		Step 3		Step 1		Step 2	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	5.856	0.178	5.514	0.167	5.410	0.172	6.689	0.238	6.688	0.238
Rumination	–	0.077	–	0.072	–0.190*	0.074	–	0.102	–	0.102
	0.403**		0.245**				0.745**		0.745**	
Strengths use (SU)			0.133**	0.017	0.001		0.061	0.078**	0.010	0.069**
Playful design (PD)			0.380**	0.018	0.174**	0.068	0.067**	0.011	0.036**	0.012
Flow									0.078**	0.011
Rumination					0.057*	0.026				
* SU										
Rumination					0.092**	0.029				
* PD										
Variances										
Person-level	0.220	0.038	0.194	0.033	0.206	0.035	0.523	0.068	0.523	0.068
Day-level	0.025	0.024	0.053	0.021	0.056	0.021	0.426	0.012	0.419	0.011
Activity-level	1.571	0.047	1.196	0.036	1.179	0.035				
Deviance	9501.727		8762.153		8735.513		5988.965		5941.740	

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

ful design were indeed positively related to flow and flourishing, whereas rumination during COVID-19 was negatively related to flow (see Table 3). Intra-class correlation results showed that all the within-person study variables displayed a significant amount of variance at the within-person level versus the between-person level: strengths use (0.547), playful design (0.636), flow (0.498) and flourishing (0.639). These results necessitate a multilevel analysis approach.

One asset of the current study is that it assessed the extent to which individuals used their strengths and playful design and experienced flow during each type of listed activity ( $N=2985$ ). The results showed that the five activities with the highest scores in strengths use were engaging in a hobby ( $M=6.03$ ), caring for or helping others ( $M=6.03$ ), exercising ( $M=5.78$ ), playing virtual games ( $M=5.52$ ) and preparing or cooking food ( $M=5.43$ ). The highest-scored activities in playful design consisted of playing virtual games ( $M=5.44$ ), exercise ( $M=5.38$ ), engaging in hobby ( $M=5.09$ ), mobility ( $M=4.91$ ) and caring for or helping others ( $M=4.55$ ). The five highest-ranked activities with flow experience were engaging in a hobby ( $M=6.17$ ), caring for or helping others ( $M=6.11$ ), spending time with others ( $M=6.05$ ), exercise ( $M=5.81$ ) and playing virtual games ( $M=5.77$ ). The preliminary descriptive analyses suggested a trend between proactive behaviours and flow (e.g., engaging in a hobby). Across the five days, activities that were reported by participants most frequently consisted of ‘studying or preparing’ ( $N=486$ , 16.3%), ‘eating’ ( $N=299$ , 10.0%), ‘spending time with others’ ( $N=263$ , 8.8%), ‘attending class’ ( $N=244$ , 8.2%) and ‘watching/listening’ ( $N=219$ , 7.3%). For the activity ‘studying and preparing’, the mean of strengths use was 5.22 ( $SD=1.37$ ), playful design scored 3.65 ( $SD=1.45$ ) and the mean of flow was 4.20 ( $SD=1.33$ ). For the ‘eating’ activity, strengths use scored 3.78 ( $SD=1.46$ ), playful design scored 3.37 ( $SD=1.42$ ) and flow scored 4.90 ( $SD=1.17$ ). For the ‘spending time with others’ activity, strengths use was 5.16 ( $SD=1.34$ ), playful design was 4.43 ( $SD=1.24$ ) and flow was 6.05 ( $SD=0.88$ ).

## 4.2 Multilevel Confirmatory Factor Analyses

We first conducted multilevel confirmatory factor analyses (MCFA) to empirically test whether the study variables could be differentiated from each other. The results showed that a five-factor model<sup>1</sup> (between-person: rumination; within-person: strengths use, playful design, flow, flourishing) showed a satisfactory fit to the data (the root mean square error of approximation (RMSEA)=0.022, comparative fit index (CFI)=0.919, Tucker–Lewis index (TLI)=0.911, standardized root mean squared residual (SRMR) for within =0.040, SRMR for between =0.078) according to the criteria of Bentler (1990). More importantly, the proposed five-factor model showed a better fit to the data compared to models with fewer factors ( $\Delta\chi^2 \geq 57.592$ ,  $p < .001$ ). These results indicate that our study constructs were valid and could be empirically distinguished.

<sup>1</sup> Note that in the measurement model, two pairs of items of flourishing were highly correlated (the first item with the third item, and the second item with the fourth item). In accordance with Brown (2015), we adjusted for these measurement errors by allowing the two pairs of items to covary.

**Table 3** Means, Standard Deviations, and Correlations Between Study Variables

		Mean	SD	ICC	1	2	3	4	5	6	7	8
<i>Between-person</i>												
<b>1 Ruminination during COVID-19</b>												
<b><i>Within-person</i></b>												
<i>Day-level</i>												
2	Strengths use at day-level	4.771	1.037	0.098		0.538**	0.534**	0.541**	0.653**	0.392**	0.230**	
3	Playful design at day-level	3.842	1.111	0.086		0.406**	0.346**	0.352**	0.727**	0.243**		
4	Flow at day-level	5.007	0.822	0.007		0.595**	0.349**	0.295**	0.598**			
5	Daily flourishing	5.047	1.131	0.639	-0.321**	0.402**	0.248**	0.333**	0.537**	0.347**	0.594**	
<i>Activity-level</i>												
6	Strengths use	4.772	1.587	0.751		-0.154**				0.541**	0.505**	
7	Playful design	3.841	1.527	0.623	-0.121*		0.394**				0.411**	
8	Flow	5.005	1.372	0.848	-0.157**	0.265**		0.203**				

Note. Correlation above the diagonal is within-person correlations (day-level,  $N=662-665$ ); below the diagonal are between-person ( $N=135$ ) correlations

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

### 4.3 Hypothesis Testing

To test Hypothesis 1, we used strengths use and playful design to predict flow. Results showed that strengths use was positively related to flow experience at an activity level ( $b=0.133$ ,  $SE=0.107$ ,  $p<.001$ ); playful design was also positively related to flow ( $b=0.380$ ,  $SE=0.018$ ,  $p<.001$ ) at the activity level. Rumination was negatively related to flow experience ( $b=-0.245$ ,  $SE=0.018$ ,  $p<.001$ ) at the between-person level. These results support Hypothesis 1.

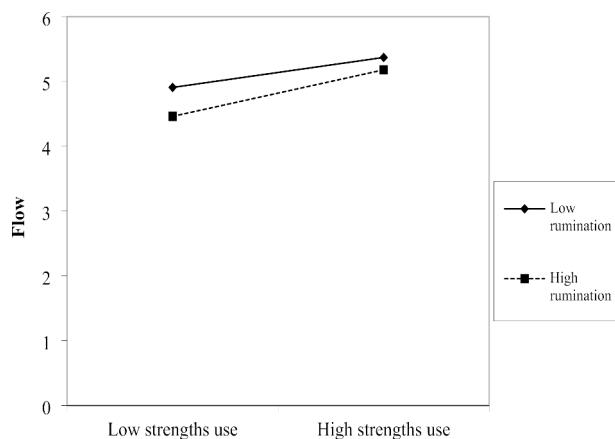
**Hypothesis 2** predicts that proactive behaviours are positively related to daily flourishing via the flow experience. Results showed that, at a within-person level, flow experience was positively related to flourishing ( $b=0.078$ ,  $SE=0.011$ ,  $p<.001$ ). Multilevel path analysis results showed that strengths use was indirectly related to daily flourishing through flow (*standardised indirect effect*=0.018,  $p=.009$ , 95% CI = [0.003, 0.042]). Playful design was also indirectly related to flourishing through flow (*standardised indirect effect*=0.046,  $p=.004$ , 95% CI = [0.014, 0.075]). These results support Hypothesis 2.

**Hypothesis 3** states that rumination during COVID-19 moderates the effects of daily, activity-based proactive behaviours on flow. Multilevel regression results showed that rumination moderates the within-person effect of strengths use on flow ( $b=0.057$ ,  $SE=0.026$ ,  $p=.014$ ) as well as the effect of playful design on flow ( $b=0.092$ ,  $SE=0.029$ ,  $p=.0007$ ). As predicted, the effects of both proactive behaviours on flow were more positive when individuals ruminated more (vs. less) about COVID-19. These results support Hypothesis 3. The simple slope test showed that no matter when individuals had high or low rumination, strengths use and playful design were positively related to flow ( $p$ 's $\leq 0.025$ ).

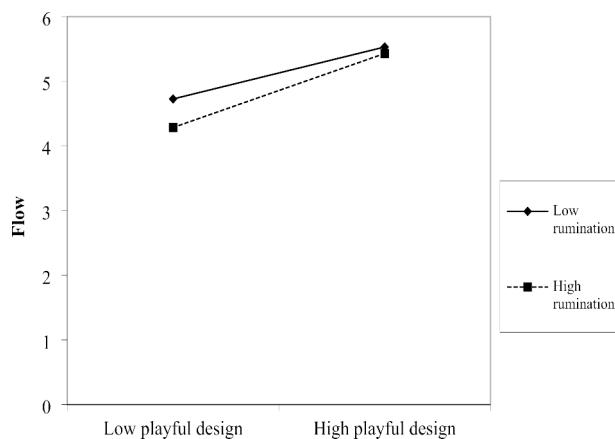
## 5 Discussion

The central aims of the current study were to investigate (1) whether proactive behaviours are positively related to daily flourishing through the flow experience and (2) whether proactive behaviour could be used as an effective strategy to buffer the potential negative effects of rumination during COVID-19. We used a day reconstruction method to collect data, which enabled us to measure strengths use, playful design and flow at a micro and dynamic level, particularly at an activity level. In line with our hypotheses, we found that strengths use and playful design were positively related to flow, which in turn was positively related to flourishing. In addition, we found that rumination moderated the effects of strengths use and playful design on flow, such that strengths use and playful design were more effective in fostering flow when individuals had a higher level of rumination. These results indicate that to function better psychologically and to flourish, people may proactively use their strengths and use playful design when they engage in daily activities.

**Fig. 2** Interaction effect of rumination with strengths use on flow



**Fig. 3** Interaction effect of rumination with playful design on flow



## 5.1 Theoretical Contributions

First, we contribute to the proactivity literature by revealing significant beneficial effects of proactive behaviours. Prior literature has established desirable as well as undesirable outcomes of proactivity (for a review, see Parker et al. 2019). Some scholars have argued that whether proactivity is beneficial depends on the strengths and contexts in which the behaviours are enacted (Cangiano et al., 2020). Our results confirm the positive effects of proactive behaviours, as we found that on the days when individuals use strengths and playful design, they experience more flow, which in turn facilitates daily flourishing. These findings add to the self-determination model of flow (Bakker & Van Woerkom, 2017) because this model proposes that individuals can create flow themselves by using proactive strategies. Nonetheless, few studies empirically tested this model. We empirically tested Bakker and Van Woerkom's (2017) model at the activity level and showed that strengths use and playful design were not only related to flow but also contributed indirectly to flourishing. Although the correlation between strengths use and playful design was high at the within-person level, our MCFA results showed that they were two distinct constructs and adding them simultane-

ously into the regression provided more stringent results (e.g., comparing the magnitude of associations).

At the same time, we contribute to flow theory (Csikszentmihalyi, 2020) because the majority of prior studies did not emphasise proactivity (i.e., personal agency and initiative) but only stated that job characteristics (i.e., autonomy) and stable personal resources (i.e., openness) shape flow (Bassi et al., 2014; Demerouti, 2006). Put differently, although previous literature has indicated that individuals have the potential to actively pursue their flow experiences (Csikszentmihalyi, 2020), it did not reveal what people can do exactly (e.g., activities) to foster flow. We add to this literature by testing concrete behavioural strategies and daily activities that can increase flow in a self-initiated manner. This provides insights for future research because it suggests that flow is not only influenced by environments and/or personalities but also determined by one's own behavioural-cognitive strategies.

Second, we found that proactivity was indirectly associated with daily flourishing through flow. Prior studies have discussed the mechanisms underlying how proactivity relates to well-being (Cangiano et al., 2019; Fay & Hüttges, 2017). For example, Yi-Feng Chen et al. (2021) found that a proactive personality could facilitate well-being during pandemics by strengthening strengths use. We respond to this literature by specifying the mechanisms underlying the positive association between episodic proactivity and flourishing. In particular, we found that the flow experience may play a role in explaining indirect effects of proactive behaviours on flourishing.

Third, we add to the literature about rumination during COVID-19 by suggesting that people can take actions proactively (i.e., on their own) to mitigate the negative effects of rumination. We revealed that individual differences in rumination were negatively related to flow experiences. This suggests that if individuals tend to ruminate more due to COVID-19 (and perhaps in general), they may not be immersed in or concentrate on their daily activities. Prior findings of the negative sides of rumination are anxiety, depression and poor mental health (Bakker & Van Wingerden, 2021; Hong et al., 2021; Ye et al., 2020). We add to this stream of research by providing insights into another important indicator of well-being: flow. Our results indicate that rumination during COVID-19 indeed impaired functioning, specifically relating to less flow (Treynor et al., 2003). However, we showed that proactive strategies help individuals have more flow experiences, particularly when people ruminate more about COVID-19. Prior studies have suggested that proactive behaviours may afford people the power to cope with COVID-19. For example, Bakker and Van Wingerden (2021) have shown that playful work design could buffer the effect of rumination related to COVID-19 on well-being indicators, such as vigour and depressive symptoms. Bakker et al. (2021) further showed that daily self-leadership and playful work design could buffer the negative effects of COVID-19. Our study complements Bakker and Van Wingerden's (2021) research because we employed proactive behaviours at a more proximal and micro level than their study. Put differently, we add to their research by pointing out the specific activities people may engage in during their daily lives to foster well-being. Taken together, our findings indicate that people may choose the activities that they are good at or actively create fun and challenge during activities in order to cope with COVID-19.

Another possibility is that, when individuals have flow experiences, a high level of rumination may undermine individual functioning and flourishing. For example, when people are in flow, their attention is diverted to focus on the task at hand, and as a result, they are less likely to let ruminative thoughts sabotage their well-being. We also examined the poten-

tial moderating role of rumination on the flow-flourishing association and found that the association between flow and flourishing is stronger (i.e., more positive) when individuals have more ruminative thoughts (please see our supplementary materials). This suggests that flow can also act as a resource and buffer the negative effects of rumination-related events, which echoes previous literature researching the moderating role of flow (Lin et al., 2020).

One asset of this study is that we employed a multilevel design, especially focusing on proactivity and well-being at an activity level, which enabled us to observe daily activities in a more concrete manner. We aimed to understand in what categories of activities people may use more of their strengths/playful design. We found that when individuals used more of their strengths or used playful design in certain activities (i.e., hobbies), they were likely to achieve flow during these activities. We further investigated whether activity category moderated the effects of strengths use and playful design on flow. As Atler et al. (2018) suggested, there were four types of activity including (1) low pleasure-low productivity, (2) high pleasure-low productivity, (3) low pleasure-high productivity, (4) high pleasure-high productivity. We found that strengths use and playful design were particularly associated with flow when individuals engaged in activities with high pleasure and high productivity (see our supplements). These findings echo Waterman's (2005) study showing that students are more likely to experience flow when they enjoy their effort.

In this sense, we add to the literature regarding positive activities (Atler et al., 2018; Lyubomirsky and Layous, 2013; Steger et al., 2008) because researchers have argued that meaningful activities might function to predict well-being. Note that there are conceptual differences between positive activities and flow activities. The former refers to activities that can gradually increase individual well-being (e.g., expressing gratitude and journaling) (Lyubomirsky & Layous, 2013), while flow activities often require a certain level of effort and a match between challenge and skills. The multilevel design, ranging from activity level to personal level, allows us to better understand what people can do during the pandemic to maintain flow experience.

## 5.2 Practical Implications

The first implication inspired by the current study is to encourage individuals to engage in positive activities daily. Specifically, people can think of what they are really good at by referring to the Values in Actions online application (Park et al., 2004), which helps identify their personal strengths, or they can make their daily activities more fun and challenging (Scharp et al., 2021). For instance, occasionally engaging in a hobby might be a good activity that results in a greater level of well-being. At the same time, people should monitor their exposure to news, such as pandemic death tolls, restrictions, postponement of lockdowns. Negative news might result in more ruminative thoughts and further impair flow.

Note that when choosing activities, individuals also need to keep an eye on the person-activity fit (Lyubomirsky & Layous, 2013). The positive-activity model introduced by Lyubomirsky and Layous (2013) proposed that small positive activities can increase well-being, but this positive effect might depend on how individuals fit with the activities, such as the duration and variety of activities. Even though strengths use and playful design may increase well-being, people should use them appropriately because proactivity might have downsides as well (Parker et al., 2019). For example, people should establish a balance between eudaimonic activities (i.e., exercise, studying, donating) and hedonic activities

(i.e., playing games, relaxing, sleeping). Because these two types of activities complement each other, the former help a person to grow, while the latter serves the purpose of relaxation (Giuntoli et al., 2021).

Although the current investigated the role of proactive behaviours during COVID-19, we propose that the beneficial effects of proactive behaviours extend to the post-pandemic period. Since we have shown that playful design and strengths use increase the likelihood of entering flow, they have the potential to help individuals deal with distress or anxiety induced by many types of negative events. Therefore, individuals are generally encouraged to develop and maintain proactive behaviours.

### 5.3 Limitations and Future Research

When interpreting the present findings, one limitation to consider is that most of the participants were university Psychology students who participated in exchange for course credits. Also, the majority of participants in the study were female. Thus, our findings cannot be directly generalized to other demographic groups. Gender differences have been reported in the selection of self-directed activities, but there were no differences between male and female young adults in terms of experiences (e.g., flow, expressiveness) within the activities (Sharp et al., 2007). Also, gender differences have been reported in rumination (Ando' et al., 2020). Thus, it remains open whether sample that differ in gender composition will also lead to different findings. Also, regarding age, older adults are more selective when making decisions and are good at not investing resources into insignificant things, thus being better aware of which choice suits them better. Future research should expand the sample to other groups, such as workers, males and older adults, to replicate the current findings.

Second, even though we used terms, such as 'proactivity' or 'proactive behaviours', we need to note that our findings are restricted to two proactive behaviours, namely strengths use and playful design. We did not test other types of proactive behaviours (i.e., self-leadership, vitality management) in relation to flow. Therefore, future studies may also want to use different forms of proactive behaviours. Furthermore, strengths use was assessed using a single item. The majority of previous research on strengths use has used multiple items (Bakker et al., 2019; Van Woerkom et al., 2016). Although single item measures have also been validated and widely used in DRM studies (Oerlemans & Bakker, 2018), future researchers are encouraged to use multiple items to assess strengths use, which could provide more robust and validated results.

Third, rumination can be conceptualised as both a between-person and a within-person variable, which indicates that it may also fluctuate from day to day (Nolen-Hoeksema et al., 2008). The potential investigation of the daily or even momentary process of rumination may also establish a more subtle understanding of the interaction between proactive behaviour and rumination. For example, it is also worth investigating whether daily rumination moderates the effects of daily proactive behaviours on flow. Also, note that the current study did not allow causal conclusions but established correlational relationships. However, we have tested possible alternative models (e.g., reverse order), and the results showed that our proposed model had a better fit than almost all comparable models (see supplements for more details). Correspondingly, researchers are encouraged to employ experimental or interventional designs to investigate the potential positive effects of proactive behaviours and to establish more causal-like associations.

Fourth, the DRM might induce recall bias because individuals did not fill in the questionnaire while they were actually performing the activity compared to the experience sampling method (ESM) (Lucas et al., 2021). Nevertheless, DRM has the advantage of providing a continuous assessment of the full day, putting less respondent pressure on participants, etc. (Kahneman et al., 2004). Recently, researchers have shown that although DRM is different from ESM methodologically they often result in comparable and similar information (Dockray et al., 2010). In many situations, the correlation between these two methods is strong. For example, the correlation between affective experiences using DRM versus ESM ranges from 0.62 to 0.84 (Kahneman et al., 2004). Regarding happiness, the correlation between the two methods is 0.73 at a between-person level, and is 0.31 at a within-person level, and the overall correlation is 0.61 on a leisure day. This literature suggests that DRM is valid and provides supplementary but essential value to ESM research. Future researchers are also encouraged to use ESM, which adopts a more momentary assessment to examine the current findings.

Finally, environmental and social determinants may also have the potential to influence people to use proactive strategies and experience flow. For example, if an individual receives more support (e.g., autonomy) or their manager encourages them to use strengths/playful design, there are non-proactive influences that can increase the likelihood of flow (Bakker, 2022). Flow is also related to individual characteristics and situational factors (Csikszentmihalyi, 2000). For example, although employees may experience flow when their skills match challenges, their flow experience may also be interrupted if they are distracted by others. Future research may want to take social and environmental factors into account, such as social support and feedback, to establish a more complete picture of the associations of proactivity. At the same time, boundary conditions may exist in terms of personality and situational factors that bolster or attenuate the effects of proactive behaviours. For example, Cangiano et al. (2019) showed that punitive leadership might strengthen the negative impact of proactivity on detachment. Support for strengths use seems to bolster the effects of strengths use on flow (Liu et al., 2021).

## 6 Conclusion

The current study focuses on rumination during COVID-19 and how proactive behaviours in activities may play an essential role in mitigating the negative effects of rumination. All in all, proactive behaviours were shown to associate with daily flourishing through flow experience. Additionally, proactive behaviours turned out to be more effective in fostering flow when individuals ruminate about COVID-19. Our study suggests that individuals have the potential to offset the downsides of COVID-19 and other crises and achieve better functioning by engaging in positive activities that they are good at or that they feel are interesting or challenging.

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